THE IRON TRADE REVIEW

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Railroad Buying is an Important Market Factor

Activity in Pig Iron and Finished Materials Continues After the Election—Growing Sentiment in Favor of 1911 Ore Prices

In the week following election there has been increased activity in some products and nowhere is there any indication of weakness in pig iron or finished materials. Mills are constantly falling farther behind in deliveries and in the Chicago district the best delivery that can be given on bars, plates and shapes is August of next year. In the Pittsburgh district, some of the leading interests will not promise deliveries of plates and shapes prior to third quarter of 1913, and some fourth quarter business on structural material is being done. The same interests cannot deliver steel bars in less than six months. The unprecedented increase of over 1,000,000 tons in the unfilled tonnage of the Steel Corporation represents business which has been taken in a very conservative way as compared with past years, but doubtless a large part of it is for delivery throughout next year.

Iron Ore

Informal discussion of prices of Lake Superior ores has continued, and while the prevailing sentiment has been in favor of a 50-cent advance, there is a growing feeling that the 1911 prices ought to prevail this year. The naming of the 1911 prices would mean an average advance of about 75 cents per ton, if the base ore guarantee is not changed. At the time of the buying movement of ores in April, 1911, Bessemer pig iron was selling at $15, valley, and foundry at $13.75, compared with $17 and $17.25 to $17.50, respectively, at the present time. Some important miners of domestic ores in the east expect to advance prices to the 1911 figures.

Pig Iron

In the Pittsburgh market, there has been heavy buying of steel-making iron, including 20,000 tons of Bessemer, taken by a Youngstown consumer at $17 and $17.15, valley, and 10,000 tons of basic purchased at $16, valley, by the Jones & Laughlin Steel Co. Heavy tonnages are pending in the Pittsburgh district. In the Philadelphia territory, the demand for forge iron continues active. A central Pennsylvania consumer of basic is in the market for 3,500 tons for first quarter. In the south, the Tennessee Coal, Iron & Railroad Co. has sold from 4,500 to 5,000 tons for second quarter delivery in the north, at $15, furnace, for No. 2 foundry. High prices for prompt delivery are being paid by foundries in the Cleveland district. It is expected that orders for large tonnages of ferro-alloys will be placed soon in the Pittsburgh district. Liberal inquiry is being received at Buffalo from Canadian melters of pig iron. A new inquiry for 3,000 tons of No. 3 iron for export to Genoa, Italy, has appeared, making the total pending inquiry from that city 10,000 tons. American buyers are reported to be sounding the German and English markets on forge iron, but with present high prices prevailing abroad, it does not seem probable that any iron will be imported.

Structural Material

Owing to the fact that deliveries of structural material cannot be obtained until far into next year except at premium prices, some building projects are being postponed. The American Bridge Co. has taken 3,500 tons for shops at Balboa, Panama. The Riter-Conley Mfg. Co. will furnish 1,500 tons for the General Electric building addition at Erie, Pa. Contracts placed at Chicago amount to 4,500 tons, nearly all of which was taken by the leading interest.

Railroad Buying

Railroads are placing orders very freely for rails, cars and track fastenings. Among the important rail orders placed were 65,000 tons by the New Haven system, divided among the Pennsylvania, Bethlehem and Lackawanna Steel companies; 25,000 tons for the Southern railroad, awarded to the Tennessee Coal, Iron & Railroad Co., and 50,000 tons for the Baltimore & Ohio, distributed among the Carnegie, Cambria, Maryland and Illinois Steel companies. The Chesapeake & Ohio is understood to have placed orders for 4,000 70-ton steel hoppers, 3,000 of which will be made by the Pressed Steel Car Co. and 1,000 by the Standard Steel Car Co. Other car orders placed include 1,500 55-ton gondolas by the Pittsburgh & Lake Erie to the Standard Steel Car Co., 800 box cars for the New York, Philadelphia & Norfolk to the American Car & Foundry Co., and 50 gondolas for the same road to the Ralston Steel Car Co. The New York, Ontario & Western has ordered 500 steel hoppers from the Cambria Steel Co. for delivery next March. The St. Paul system has placed an order for 3,000 underframes with the Bettendorf Axle Co. The Pacific Fruit Express has ordered 2,000 refrigerator cars from the American Car & Foundry Co., and the San Antonio & Aransas Pass, 1,000 box cars from the same company. Orders for railroad bridges include 5,000 tons for a bridge for the Pennsylvania Lines West, and 1,200 tons for the Long Island railroad, both placed with the Pennsylvania Steel Co.

PITTSBURGH

Heavy Buying of Steel Making Pig

Office of THE IRON TRADE REVIEW,
2148-49 Oliver Bldg., Nov. 12.

Some of the leading iron and steel manufacturers in this district are unable to promise deliveries of finished products until the third and, in some instances, the fourth quarter. Most cautious mills are refusing to accept orders except for specific work, but in spite of this fact, it is believed considerable speculative tonnage has been booked.

The leading interest continues to quote 1.45c on steel plates and structural shapes, and most of the independent mills are asking 1.50c, for forward shipment. Several interests, however, are refusing to accept additional contracts, and some talk of an advance is heard.

The pig iron market, despite the heavy buying of a week ago, continues active. A leading Youngstown consumer has closed for a heavy tonnage of Bessemer, at about $17, valley, and one of the independent mills in this city has purchased a large block of basic, at $16, valley, which is now considered the minimum market price.

Railroads have been buying heavily. Car builders, manufacturers of steel rails, spikes and track fastenings are enjoying an unusually heavy volume of business, and prices of spikes and fastenings have stiffened considerably.

The coke market remains stationary; it is a trifle softer, if anything. Heavy melting steel has weakened somewhat.

Pig Iron.—Buying of steel-making iron has continued at a heavy rate and large tonnages are involved in pending transactions. Among the most important purchases was that of a Youngstown consumer which involved 20,000 tons of Bessemer for first quarter shipment. This iron was obtained at $17 and $17.15, valley furnace, although the bulk was secured at the minimum quotation.

The Jones & Laughlin Steel Co. has closed negotiations for 10,000 tons of basic at $16, valley furnace, through one of the local brokers.

The Cambria Steel Co.'s purchase has been the subject of considerable discussion. Since last week's report, it has developed that the 29,000 tons of basic involved were obtained at $16 and $16.25, valley furnace. The 30,000 tons of Bessemer, as previously stated, brought $17, valley.

The Republic Iron & Steel Co., Youngstown, O., has not figured in the market since its purchase of 24,000 tons of Bessemer and 6,000 tons of basic, three or four weeks ago. The Pittsburgh Steel Co. has not yet closed for 20,000 tons of this year's basic iron. Reports to the effect that this interest has withdrawn its inquiry and will buy in the open market are both denied and affirmed.

No. 2 foundry has sold at $17.50, valley, and we now quote this grade at a range from $17.25 to $17.50. Malleable, also, has reached the $17.50, valley base, and we quote this iron at the same spread. It is advised that the Fannie furnace of the M. A. Hanna & Co., Cleveland, and the Ella furnace, of the Pickands, Mather & Co., Cleveland, both at West Middlesex, O., will resume operations Jan. 1. Both furnaces have been idle about two years. Revised quotations on all grades are as follows:

(Remainder of Year and First Quarter.)

Bessemer, valley	$17.00
Bessemer, Pittsburgh	17.90
Basic, valley	16.00 to 16.25
Basic, Pittsburgh	16.90 to 17.15
No. 2 foundry, valley	17.25 to 17.50
No. 2 foundry, Pittsburgh	18.15 to 18.40
Gray forge, valley	16.00
Gray forge, Pittsburgh	16.90
Malleable, valley	17.25 to 17.50
Malleable, Pittsburgh	18.15 to 18.40

Ferro-Alloys.—It is understood that the heaviest consumer in this district will close for 8,000 tons of 50 per cent ferro-silicon, 8,000 tons of ferro-chromium and about 1,500 tons of aluminum, the latter part of this week. Several dealers are quoting as high as $80 to $90 for ferro-manganese for shipment this year and first half. Others, however, continue to offer the $61 quotation for forward shipment and no sales above $75 have been noted. Difficulty is being experienced in obtaining anything like prompt material.

We quote 80 per cent ferro-manganese at $70 to $75, Baltimore, for prompt delivery and $61 for forward shipment. The freight rate from Baltimore to Pittsburgh is $1.95 per ton.

Fifty per cent ferro-silicon is quoted at $75, Pittsburgh, for prompt and forward delivery; 12 to 13 per cent, $25 to $26, 11 to 12 per cent, $24 to $25; 10 to 11 per cent, $23 to $24; 9 to 10 per cent, $22 to $23, f. o. b. Globe, Jisco and Ashland furnaces. The freight rate to Pittsburgh is $1.90. The foreign grades are held at $1 or more a ton over domestic prices.

On ferro-titanium we quote 8 cents per pound for carload lots; 10 cents per pound for 2,000 pound lots and over, and 12½ cents per pound in lots up to 2,000 pounds.

Plates.—Some of the mills are booked into the third quarter in steel plates and it is probable that advanced quotations will become effective before the end of the year, according to advice from some of the independent mills. About 30,000 tons of steel cars are involved in pending inquiries. The Pittsburgh & Lake Erie railroad has placed an order for 1,500 gondola cars with the Standard Steel Car Co. and the Cambria Steel Co. has taken an order for 500 steel hopper cars from the New York, Ontario & Western railroad for delivery next March.

It is understood that the Chesapeake & Ohio railroad has placed an order for 4,000 70-ton steel hopper cars, 3,000 of which will be made by the Pressed Steel Car Co. and 1,000 by the Standard Steel Car Co. The Norfolk & Western is in the market for various types of cars and the Missouri Pacific is negotiating for 4,000 cars.

The East Jersey Pipe Co. has taken a preliminary order for 2,500 tons of riveted steel pipe for shipment to Winnipeg, Can. The Mexican Eagle Oil Co. has not yet closed for steel to be used in oil tanks in Mexico. We quote the market for both prompt and forward shipment as follows:

Standard steel plates ¼ inch thick, 6¼ to 100 inches, 1.45c to 1.50c for shipment after Jan. 1 and 1.60c to 1.80c for prompt shipment. For extras, see card of Sept. 1, 1909.

Sheets.—Several mills advise that specifications and shipments in October broke all previous records. Despite the fact that heaviest consumers already have covered requirements for first and second quarter, there has been considerable demand for prompt and forward delivery. It is understood that one of the independent mills is asking fancy prices for immediate shipment and some consumers are willing to pay premiums when in need of prompt material. Unlike the conditions that existed early this year, prevailing

quotations are not being shaded in any instance. All of the sheet mills in this district are operating at capacity, although some complaint is heard about the scarcity of raw material. Quotations follow:

Flat Sheets.

Black Sheets.—Nos. 10-12 gage, $1.90 per 100 pounds; Nos. 13-14 gage, $1.95; Nos. 15-16 gage, $2.00; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-26 gage, $2.15; No. 27 gage, $2.20; No. 28 gage, $2.25; No. 29 gage, $2.30; No. 30 gage, $2.40.

Tin mill sizes. Nos. 15-16 gage, $2.00 per 100 pounds; Nos. 17-21 gage, $2.05; Nos. 22-24 gage, $2.10; Nos. 25-27 gage, $2.15; No. 28 gage, $2.20; Nos. 29-30 gage, $2.25; Nos. 30½-31 gage, $2.30; No. 32 gage, $2.35.

Blue Annealed.—Nos. 3-8, $1.60 per 100 pounds; Nos. 9-10, $1.65; Nos. 11-12, $1.70; Nos. 13-14, $1.75; Nos. 15-16, $1.85.

Galvanized.

Nos. 10-11 gage, $2.40 per 100 pounds; Nos. 12-14 gage, $2.50; Nos. 15-16 gage, $2.65; Nos. 17-21 gage, $2.80; Nos. 22-24 gage, $2.95; Nos. 25-26 gage, $3.10; No. 27 gage, $3.25; No. 28 gage, $3.40; No. 29 gage, $3.55; No. 30 gage, $3.70.

Roofing Sheets

Net extras on all gages per 100 pounds. Corrugated 2-inch, 2½-inch, 3-inch and 5-inch corrugation, 5c; 2 V crimped without sticks, 5c; corrugated 1¼-inch corrugation, 10c; 3 V crimped without sticks, 10c; pressed standing seam with cleats, 15c; plain roll roofing with or without cleats, 15c.

Painted Roofing.

12 to 18 gage, inc., 5c; 19 to 24 gage, inc., 10c; 25 to 28 gage inc., 15c.

Tin Plate.—All the serviceable tin plate mills in this territory are operating at full capacity except those that are unable to obtain sufficient raw material. Contracting continues heavy, but has fallen off to a slight extent. The $3.60 base price is being firmly maintained and some makers are quoting $2 a ton above this figure for undesirable tonnage. The prevailing price follows:

Coke tin plate, 100-pound basis, 14 x 20, $3.60, f. o. b. mill, Pittsburgh district.

Rails and Track Fastenings.—The Baltimore & Ohio railroad has closed negotiations for its initial purchase of steel rails for 1913 shipment, having bought more than 50,000 tons. The order was distributed among the Carnegie, Cambria, Maryland and Illinois Steel companies. Although leading eastern roads have placed heavy tonnages, it is generally believed purchases will be supplemented later on, as all the contracting thus far has been for specific work. Mills rolling light rails are unable to promise material until after Jan. 1. Spikes have stiffened somewhat the past week, and are now uniformly quoted at $1.90. Track bolts have been advanced from 2.25c to a range from 2.40c to 2.50c. Rails are quoted as follows, with the base price on open-hearth standard sections at 1.34c per pound at the mill:

Fifty-pound and heavier, 1.25c per pound; carloads and less than 500 tons, 1.34c per pound; light rails on base weight of 40 to 45 pounds, 1.25c, the schedule on the other weights being irregular and subject to negotiations; angle bars for standard sections, 1.50c, Pittsburgh; track bolts, 2.40c to 2.50c, base, Pittsburgh.

Railroad Spikes.

4½, 5 and 5½ and 9-16	$1.90
3, 3½, 4, 4½ and 5 x ½	.10
3½, 4 and 4½ x 7-16	.20
3, 3½, 4 and 4½ x ⅜	.30
2½ x ⅜	.40
2½, 3 and 3½ x 5-16	.60
2 x 5-16	.80

Billets and Sheet Bars.—Considerable new demand for semi-finished materials is reported, and it is understood that several quiet sales have been made. Specifying has been heavy and without exception consumers are asking additional tonnage. The scarcity of semi-finished steel, combined with deferred shipments, has caused considerable embarassment on the part of the mills. Interests that have not covered requirements are facing a serious situation on account of the acute scarcity. We quote the market nominally as follows:

Bessemer 4 x 4 billets with 0.25 carbon and less are quoted at $26.50 to $27.00, with the usual extra for size and analysis, and open-hearth rolling billets, $27.00 to $27.50. Bessemer sheet and tin bars are quoted at $27.50 to $28.00 and open-hearth sheet bars are quoted $28.00 to $28.50, f. o. b. Pittsburgh and Youngstown, with full freight to destination added. Forging billets are quoted at $33.00 to $34.00, Pittsburgh.

Hoops and Bands.—Several makers are quoting 1.60c, Pittsburgh, for steel hoops, although the 1.50c quotation is still possible where heavy tonnages are involved. We now quote heavy rods at a range from 1.50c to 1.60c. Bands are quoted on the same basis as steel bars, 1.40c to 1.45c. Specifying is liberal and there has been some new demand. Shipments are deferred from eight to 12 weeks. Prices follow:

Hoops in carload lots, 1.50c to 1.60c, Pittsburgh, in less than carload lots, 1.55c to 1.60c; bands, 1.40c to 1.45c, base, with net extras, as per standard steel.

Merchant Bars.—Manufacturers of steel bars continue to book heavy tonnage, although most of the present buying is for second or third quarter shipment. Some of the mills have withdrawn from the market, being unable to make deliveries until after July 1. One consumer this morning advised that 1.90c was the lowest quotation he was able to obtain on a fairly large tonnage of prompt material.

Iron bar makers are now quoting at 1.70c to 1.80c, the maximum figure representing the price of material for prompt shipment. Shafting is firm on a basis of 60 per cent off for carload lots and 55 per cent off for less than carload lots. Revised quotations follow:

Common iron bars, 1.70c to 1.80c, Pittsburgh; Bessemer and open-hearth steel bars, 1.40c to 1.45c; plow and cultivator, 1.40c to 1.45c; channels, angles, zees, tees, under 3 inch, 1.50c to 1.55c, all f. o. b. mill. The following differentials are maintained on steel: Less than 2,000 pounds and not less than 1,000 pounds of a size, 0.15 advance, less than 1,000 pounds of a size, 0.35. Cold rolled and ground shafting, 60 per cent off in carloads and 55 per cent in less than carloads delivered in base territory.

Muck Bar.—The muck bar market continues quiet. In the absence of sales, it is difficult to offer anything but a nominal quotation. We quote muck bar at $32, Pittsburgh.

Bolts, Nuts and Rivets.—Several interests are now quoting 2.10c and 2.20c, respectively, for structural and boiler rivets for rather prompt shipment. Makers as a rule, however, continue to book tonnage at $2 a ton less than these figures for forward shipment. Demand for nuts, bolts and rivets continues rather heavy and deliveries are deferred from three to four months. We now quote button head structural rivets at 2c for forward shipment and 2.10c for prompt shipment. Other quotations follow:

Rivets

Button head structural rivets, 2c, forward 2.10c prompt; cone head boiler rivets, 2.10c, forward; 2.20c prompt.

Bolt and Nut Discounts

Carriage bolts, ⅜ x 6 inches, smaller and shorter, rolled threads, 75, 10 and 2½; cut threads, 75 and 7½; larger and longer, 70 and 5.

Machine bolts with hot pressed nuts, ⅜ x 4 inches, smaller and shorter, rolled, 75, 10, 10 and 2½; cut, 75, 10 and 7½; larger and longer, 70, 10.

Gimlet and cone point lag or coach screws, 80 and 10.

Hot pressed square, blank or tapped nuts, $5.80 off list; hot pressed hexagon blank or tapped, $6.40.

Cold pressed C. & T. square, blank or tapped, $5.80 off; hexagon, blank or tapped, ⅝-inch and larger, $6.70 off; smaller than ⅝-inch, $7.30 off.

Structural Shapes.—Several rather important contracts have been taken and heavy tonnages of structural steel are involved in pending inquiries. The American Bridge Co. advises that it has taken 3,000 tons for an office building at Atlanta, Ga., to be erected by the Healey Real Estate & Improvement Co. and this interest has taken several small orders for bridge work.

The Riter-Conley Mfg. Co. has taken about 1,300 tons for a 400-foot extension to the machine shops of the General Electric Co., at Erie, Pa., work on which will begin shortly. This company also has taken 80 tons for dam gates at Messena, N. Y. Interest is being taken in a 17-story bank and office building to be erected at Lexington, Ky., which will require about 3,000 tons, and a large apartment house at Birmingham, Ala., which involves about 2,000 tons.

Quotations remain unchanged, although it is believed that some of the independent mills will advance prices just as soon as they are in a position to book additional tonnage. Prices follow:

Standard structural shapes, 1.45c to 1.50c, for shipment after Jan. 1 and 1.60c for prompt shipment. For extras see card of Sept. 1, 1909.

Merchant Pipe. — Several manufacturers of iron and steel pipe advise that specifications have been received on nearly all contracts, but it will be impossible for mills to meet full obligations before the end of the year. Consumers are anxious to obtain material before cold weather makes it impossible for outdoor work. Talk of an advance in both iron and steel pipe is heard. Today an inquiry for 15 miles of 10-inch pipe for western shipment was announced. Other inquiries include four miles of 4-inch line pipe and two miles of 6-inch pipe for western shipment. An Ohio pipe maker has taken an order for 15,000 feet of 6⅝-inch casing and 8,000 feet of 8¼-inch casing for Oklahoma shipment. Official discounts to jobbers, subject to the usual preferential discount of the large buyer are as follows:

Iron and Steel Pipe Basing Prices.

STEEL.

	Butt.		Lap.	
	Black.	Galv.	Black.	Galv.
⅛, ¼ and ⅜ inch.	72	52	..	..
½ inch	76	66	..	..
¾ to 3 inch.....	79	71	..	..
2 inch	..	..	76	68
2½ to 6 inch.....	..	..	78	70
7 inch to 12 inch..	..	..	76	66
13 to 15 inch.....	..	..	53	..
Extra Strong, Plain Ends.				
⅛, ¼ and ⅜ inch.	68	58	..	..
½ inch	73	67	..	..
¾ to 1½ inch.....	77	71	..	..
2 to 3 inch.....	78	72	..	..
2 inch	..	..	74	66
2½ to 4 inch.....	..	..	76	68
4½ to 6 inch.....	..	..	75	67
7 to 8 inch.....	..	..	68	58
9 to 12 inch.....	..	..	63	53
Double Extra Strong Plain Ends.				
½ inch	63	57	..	..
¾ to 1½ inch.....	66	60	..	..
2 to 2½ inch.....	68	62	..	..
2 inch	..	..	64	58
2½ to 4 inch.....	..	..	66	60
4½ to 6 inch.....	..	..	65	59
7 to 8 inch.....	..	..	58	48
IRON.				
⅜ inch	66	47	..	..
½ inch	70	57	..	..
¾ to 2½ inch.....	73	62	..	..
2 inch	..	..	69	59
2½ to 6 inch.....	..	..	71	62
7 to 12 inch.....	..	..	69	56
Extra Strong Plain Ends, Card Weight.				
⅜ inch	64	53	..	..
½ inch	68	61	..	..
¾ to 1½ inch.....	72	63	..	..
2 and 2½ inch.....	73	64	..	..
2 inch	..	..	67	59
2½ to 4 inch.....	..	..	71	62
4½ to 6 inch.....	..	..	70	61
7 to 8 inch.....	..	..	64	54
9 to 12 inch.....	..	..	59	48
Double Extra Strong Plain Ends, Card Weight.				
½ inch	58	50	..	..
¾ to 1½ inch.....	61	53	..	..
2 and 2½ inch.....	63	55	..	..
2 inch	..	..	56	50
2½ to 4 inch.....	..	..	61	55
4½ to 6 inch.....	..	..	60	54
7 and 8 inch.....	..	..	53	43

Plugged and reamed pipe is furnished at 2 points higher price, either butt or lap weld.

The above discounts are for full weight pipe, subject to a variation of 5 per cent, merchant pipe, when specified, being furnished up to 6 inches at one point higher discount (lower price).

Boiler Tubes. — The demand for both iron and steel tubes continues heavy and specifications have been liberal. Mills are badly deferred in shipments and premium prices are being paid for prompt material. Quotations follow:

	Steel.	Iron.
1½ inch	..	..
1¾ to 2¼ inch.....	62	47
2½ inch	64½	52
2¾ to 3¼ inch.....	69½	54½
3½ to 4½ inch.....	72	57
5 and 6 inch.....	64½	..
7 to 13 inch.....	62	..

To destination east of Mississippi river will be sold at delivered discount for carloads lowered by 2 points, for lengths 22 feet and under; longer lengths, f. o. b. Pittsburgh. Usual extras to jobbers and boiler manufacturers.

Wire.—Several independent mills are now quoting wire nails at $1.75 and plain wire at $1.55, which represents prices announced about three weeks ago by the Jones & Laughlin Steel Co. Comparatively little tonnage for shipment beyond Jan. 1 has been sold. Specifications against contracts have been to the full extent in all instances and mills are rapidly cleaning up low-priced business. Before much tonnage for 1913 is booked, it is probable that prices will be uniformly advanced to the $1.75 base quotation for nails. The prevailing quotations are:

Wire nails, jobbers' carload lots, $1.70 to $1.75, retailers' carload lots, $1.75 to $1.80; cut nails (western makers), jobbers' lots, $1.70; painted barb wire, jobbers' carload lots, $1.70 to $1.75; retailers' carload lots, $1.75 to $1.80, with 40c for galvanizing; plain wire to jobbers in carloads, $1.50 to $1.55; and to dealers, in carloads, $1.55 to $1.60; polished staples, $1.70 to $1.75; galvanized staples, $2.10.

Wire Rods.—The leading interest is out of the market and but a few of the larger independent mills are able to produce surplus tonnages. There has been considerable new inquiry and a few sales are noted. One of the independent mills, a few days ago, sold a round tonnage of open-hearth wire rods at $30, Pittsburgh, and we now quote the market at a range from $29.50 to $30, Pittsburgh.

Coke.—From present indications it looks as if the deadlock between producers and buyers of contract furnace fuel would be broken shortly in favor of the consumers. Dealers who have been quoting $3.50, ovens, appear willing to accept $3, which is not considered a prohibitive figure. The market for spot furnace fuel is quoted at a range from $3.85 to $4, ovens, and the minimum figure is ruling more than it was a week ago. Prompt foundry fuel has sold as high as $4.75, furnace, and we now quote the market at a range from $4.40 to $4.50, ovens. The Connellsville *Courier* for the week ending Nov. 2, says production fell off 2,552 tons, as compared with the week before. The merchant ovens experienced the greater loss. Shipments decreased 131 cars. Quotations this week follow:

Connellsville furnace	$3.85 to 4.00
Connellsville furnace contract.....	2.75
Connellsville foundry	4.40 to 4.50
Connellsville foundry contract....	3.50 to 4.00

Old Material.—The market for iron and steel scrap continues to show weakness. A consumer of heavy melting steel today announced that it is impossible to obtain this stock at $15.25, which is $1 below the prevailing quotation of two weeks ago. We now quote heavy melting steel at $15.25 to $15.50, delivered. Some of the dealers fear heavy melting material will drop to $15 before the end of the week, although every effort is being made to prevent a further decline.

Heaviest consumers have considerable stock on hand and will not have to buy much material for several weeks. A number of dealers have been requested to hold up shipments as much as possible and the Carbon Steel Co. has ordered an embargo placed against its works. Considerable scrap has been rejected, which indicates that consumers are not in dire need of stock. The old material market generally is the first to reflect either strength or weakness. No significance is attached to the present situation, however, and middle men believe the $16 quotation will be ruling before long.

Low phosphorus has declined 25 cents the last seven days, having sold as low as $18.25. We now quote low phosphorus at a range from $18.25 to $18.75. Old iron rails are now quoted somewhat above the price of a week ago. Little or no inquiry is reported and some of the dealers are rather discouraged about the winter prospects. We quote per gross ton for delivery to mills in the Pittsburgh district, as follows:

Heavy melting scrap.....	$15.25 to 15.50
Rerolling rails	16.50 to 17.00
Malleable	14.50 to 15.00
Bundled sheet scrap.....	13.00 to 13.50
Iron axles	25.00 to 26.00
Old iron rails.....	16.75 to 17.25
Stove plate	11.00 to 11.50
No. 1 wrought scrap.....	15.50 to 16.00
Old car wheels.....	15.75 to 16.25
Low phosphorus	18.25 to 18.75
Machine shop turnings.....	11.25 to 11.75
Cast borings	10.25 to 10.75
No. 1 cast scrap.....	14.50 to 15.00

The Midland, Pa., furnace of the Pittsburgh Crucible Steel Co., Pittsburgh, will be relined before Jan. 1, although no definite plans have been announced. This stack has operated five or six years on one lining.

CHICAGO

Mills Falling Farther Behind in Deliveries

Office of THE IRON TRADE REVIEW,
1328 Monadnock Bldg., Nov. 12.

In spite of the producers' policy of discouraging business in finished lines for the second half delivery, insistent demands of buyers are necessitating the placing of considerable tonnage for delivery at that time. In steel bars, plates and shapes, the earliest delivery that can be made by mills in this territory is August, 1913, and the date at which delivery can be made on bar iron is constantly advancing. Railroad buying of both rails and cars continues unabated and sales of the former made during the first week in November have set a new record for the year. Quotations on track fastenings are stronger, reflecting the condition of the whole market, and prices on most other finished lines are purely nominal. Representatives of some of the large eastern producers are not in a position to take business for the first half, owing to large unfilled tonnage, which will remain on their books at the first of the year.

Pig Iron.—The election has been followed by increased activities in the pig iron market and inquiries for both northern and southern irons are appearing in greater numbers and for larger tonnages. This has resulted in an advance of 50 cents a ton on northern iron, both foundry and malleable being firm on a basis of $18, local furnaces. Inquiry for immediate delivery is heavier, especially from the Milwaukee district, where the failure of one of the merchant stacks to blow in has thrown considerable tonnage on the market. A Milwaukee melter took 200 tons of iron from a local producer during the week at a price understood to be $18.25 f. o. b. furnace. Southern iron is also stronger, the minimum for delivery during the remainder of the year being $14.00, Birmingham, and $14.50 for the first quarter. While some tentative quotations for second quarter are current, all orders involving a delivery at that time must be submitted to the furnaces. Although $14.00 is the ruling quotation for immediate delivery, approximately 360 tons of southern iron were sold during the week at a price understood to be $14.50. There is no real shortage of iron in this market at present, but that condition is expected, as the local furnaces have practically no stocks on hand. It is also reported that the large stocks held in the Mahoning valley, which, it was thought, would be available for this market, have already been sold. The heavy demand for steel-making iron is causing a further congestion, as some stacks that have been running on foundry iron have changed their make to the former material.

The following prices represent the market for Chicago delivery with the exception of northern foundry and malleable Bessemer, which are quoted f. o. b. local furnaces:

	Rest of year.	First quarter.
Lake Superior Charcoal	$18.75	$19.25
Northern foundry No. 2	18.00	18.00
Southern foundry No. 2	18.35	18.85
South'n Silveries, 5 per cent sil.	19.35	.....
Jackson co. silv'r's 8 per cent.	21.40	21.90
Malleable Bessemer	18.00	18.00
Alabama basic	18.85	.....

Merchant Bars.—Insistent demands from buyers for early delivery are constantly advancing the date at which new business can be taken. Bar iron is very firm at current quotations, the bulk of business being placed at 1.55c. The scarcity of re-rolling rails continues to affect quotations on hard steel bars and considerable business has been placed at 1.75c. Prices on soft steel are nominal, owing to the congested condition of the mills and to the fact that second half business is being discouraged. With few exceptions, bar iron producers in this territory are unable to make delivery earlier than the middle of January.

We quote, f. o. b. Chicago, as follows:

Bar iron, 1.50c to 1.55c, hard steel bars, rerolled, 1.60c to 1.75c, soft steel bars, bands and small shapes, 1.63c; hoops, 1.63c; smooth finished machinery steel, 1 inch and larger, 1.78c; shafting 60 per cent off list for carload lots, 55 per cent off for less than carloads.

On iron and steel from local stock, we quote as follows:

Bar iron, 1.95c per pound base; soft steel bars, 1.95c per pound base; soft steel hoops, 2.20c, full extras.

Structural Material.—Structural lettings in the west have again fallen off and small contracts which can be filled from store constitute the majority of the business. The condition of the market of this territory is bare of any interesting feature. Congested mill schedules are still prevailing and no business is being taken for delivery earlier than July, 1913. Owing to the fact that western producers are practically out of the market, quotations are nominal.

The structural contracts placed during the week amount to 4,536 tons, almost all of which was taken by the leading interest. This majority includes 3,719 tons taken from the Northern Pacific Railway Co., and 285 tons from George W. Fisher for a building at Seattle, and 170 tons from the Southern Pacific Railway Co. for galvanized bracket arms. The Omaha Structural Steel Co. has taken 362 tons for the Citizens' hotel, Hastings, Neb.

We quote, f. o. b. Chicago, as follows:

Beams and channels, 15 inch and under, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

All angles, 3 inches and larger, including 6 inches, $2.05 per 100 pounds; angles over 6 inches, $2.15 per 100 pounds, base; beams, 3 to 15 inches, inclusive, $2.05 per 100 pounds, base; channels, 3 inches and larger, $2.05 per 100 pounds, base.

Rails and Track Fastenings.—Railroad buying continues in unprecedented quantities and the first of October has brought a larger volume of sales than was made during any like period of the year with but one exception. The large tonnages of rails necessitate a like activity in track fastenings, of which business leading independents are obtaining a good share. Subsidiaries of the Corporation are still taking most of the rail business and the time at which the capacity for 1913 will be exhausted is approaching rapidly. Independent producers in this territory are almost out of the market for track fastenings and it is expected that higher quotations will be in order in the near future.

We quote light rails, f. o. b. Chicago, as follows:

Light rails, carloads, 25 to 45-pound, 1.30c; 16 to 20-pound, 1.35c; 12-pound, 1.40c; 8-pound, 1.50c.

Light section relayers, 45 pounds and under, subject to inspection, $22 to $24; standard section relaying rails, subject to inspec-

Track fastenings, f. o. b. Joliet, are as follows:

Track fastenings, f. o. b. Joliet, angle bars 1.50c; railroad spikes, 1.95c; smaller size

spikes, 1.75c base; track bolts with square nuts, 2.30c to 2.40c.

Plates.—No change in the market for this material is evident and, as in other finished lines, quotations remain nominal. Car buying is maintained at the same rate and the difficulties of the builders in obtaining material are more pronounced. Although western producers are doing everything in their power to discourage buying for the second half of next year, considerable business has been placed for delivery at that time. The Pacific Fruit Express has ordered 2,000 refrigerators from the American Car & Foundry Co., and the San Antonio & Aransas Pass has ordered 1,000 box cars from the same builder. The Chicago, Rock Island & Pacific is in the market for 10 baggage cars, 12 smoking cars, 20 coaches, 18 chair cars, 8 dining cars, 1,000 box cars, 500 coal cars, 250 refrigerator cars and 50 caboose cars. The Northern Pacific has split its order for cars mentioned last week as follows: 2,500 box cars and 1,100 refrigerator cars from the Pullman Co., 200 ore cars and 500 gondolas from the Pressed Steel Car Co., and 250 stock cars from the Whipple Car Co.

We quote, f. o. b. Chicago, as follows:

Tank plates, ¼ inch thick, 6⅝ to 100 inches wide, 1.68c. For extras, see Pittsburgh report.

Store prices are as follows:

Tank steel, ¼ inch and heavier, up to 72 inches wide, $2.05.

Bolts, Nuts and Rivets.—An upward tendency in the market is again evident and makers in this territory are receiving large volumes of specifications. No seasonal dullness is apparent and in conformity with other lines the present activity is expected to continue throughout the winter.

We quote prices on bolts, nuts and rivets as follows:

Rivets

Structural rivets, ¾ to 1¼ inches, 2.08c to 2.18c. base, Chicago, in carload lots; boiler rivets, 0.10c additional.

Bolt and Nut Discounts

Carriage bolts up to ⅝ x 6 inches, rolled thread, 75-10-2½; larger sizes, 70-5.

Machine bolts, up to ⅝ x 4 inches, rolled thread, 75-10-7½; cut thread 75-10-2½; larger sizes, 70-10.

Hot pressed nuts, square head, $5.80 off per cwt.; hexagon, $6.40 off per cwt.

Sheets.—The conditions in the market for sheets are almost parallel with those maintaining in bars, plates and shapes. The quantity available for the second quarter delivery is almost negligible and producers are discouraging purchases for second half. Prices are very firm with a marked upward tendency and on some sizes mill quotations in this territory are in excess of Pittsburgh basing prices.

We quote f. o. b. Chicago, as follows:

Blue annealed, No. 10, 2.15c; No. 12, 2.20c. Box annealed, No. 28, 2.70c. Galvanized No. 28, 3.95c.

For mill prices, see Pittsburgh report. Freight to Chicago, 18 cents.

Wire Products.—Both specifications and sales on wire products are constantly increasing and while no material advances have been made, a strong upward tone is very evident. The leading interest has advanced its quotations on wire netting only, and on other lines is adhering to the previous basis.

We quote f. o. b. Chicago, as follows:

Wire nails, jobbers' carload lots, $1.88; retailers' carload lots, $1.93, retailers' less than carload lots, $1.98; painted barb wire, jobbers' carload lots, $1.88; retailers' carload lots, $1.93; retailers' less than carload lots, $1.98, with 40c for galvanizing; plain wire, jobbers' carload lots, $1.68; retailers' carload lots, $1.73.

Merchant Pipe and Tubes.—Buying of this material has diminished but little and the dullness usually experienced at this time of the year is hardly felt. Prices are very strong and the makers are still behind on deliveries.

We quote store prices on merchant pipe and tubes, as follows:

Iron and Steel Pipe Basing Prices.

	Steel.		Iron.	
	Black.	Galv.	Black.	Galv.
Butt.				
⅛ inch and ¼ inch.	69.2	48.2	62.2	41.2
⅜ inch	73.2	62.2	67.2	51.2
½ inch to 1½ inch.	76.2	67.2	70.2	58.2
Lap.				
2 inch	73.2	64.2	67.2	57.2
4½ inch to 6 inch.	75.2	66.2	68.2	59.2
Card Weight.				
7 inch to 12 inch...	72.2	61.2	66.2	55.2
Extra Strong Plain Ends.				
Butt.				
⅛, ¼, ⅜ inch.....	64.2	52.2	59.2	47.2
½ inch	69.2	57.2	64.2	52.2
2 inch to 3 inch....	74.2	62.3	....	....
Lap.				
2 inch	70.2	58.2	65.2	53.2
7 inch to 8 inch....	64.2	52.2	59.2	47.2
Double Extra Strong.				
Butt.				
½ inch	57.2	45.2	....	....
¾ inch to 1½ inch	60.2	48.2	....	....
Lap.				
2 inch	58.2	46.2	....	....
4½ inch to 6 inch..	59.2	47.2	....	....
7 inch to 8 inch....	52.2	40.2	....	....

Tubes.

	Lap weld steel.	Charcoal iron.	Shelby seamless.
	Per cent.	Per cent.	Per cent.
1 inch	37	..	55½
1¼ to 2½ inch.....	53	38	34
2¾ to 3¼ inch.....	63	48	44
3½ to 4½ inch.....	65½	48	44
5 to 6 inch.....	53	..	..

Cast Iron Pipe. — The market is still bare of any material tonnages and while early purchases are being considered by a number of municipalities, no inquiries have developed as yet. Prices remain firm and as pig iron continues to advance higher quotations on cast iron pipe are even more certain.

We quote f. o. b. Chicago, as follows:

Four-inch water pipe, $30, 6 to 12 inches, $28, larger sizes, $27; gas pipe, $1 a ton higher.

Old Material.—The scrap market continues to decline and dealers have been unable to move their stocks even at the lower prices at which they have been offered. Stocks in the hands of both consumers and dealers are very large and as the former feel no necessity of buying at present the latter must conform their quotations accordingly. Further declines in the market are expected until the present floating stock is absorbed, which may be from four to eight weeks. Railroad lists continue small, as it is impossible to move any great quantity of scrap owing to the scarcity of both cars and labor. The Michigan Central has invited bids on 1,452 tons of mixed scrap, of which the principal item is 100 steel rails, and the Wabash is out with a small list on which bids were closed Monday. Small lists have also been sent out by the Southern Railway Co., and the B. & O.

We quote for delivery in consumers' yards, Chicago, as follows:

Gross Tons

Old car wheels	$14.75 to 15.25
Old iron rails	17.00 to 17.50
Rerolling rails (5 ft. and over)	16.25 to 16.75
Old steel rails (3 ft. and und.)	14.50 to 15.00
Frogs, switches and guards	13.75 to 14.25
Heavy melting steel	13.50 to 14.00
Shoveling steel	13.50 to 14.00

Net Tons

No. 1 R. R. wrought	$13.00 to 13.50
No. 2 R. R. wrought	12.00 to 12.50
Arch bars and transoms	17.00 to 17.50
Knuckles, couplers and springs	12.75 to 13.25
Shafting	16.50 to 17.00
Iron car axles	21.50 to 22.00
Steel car axles	17.75 to 18.25
Locomotive tires	13.50 to 14.40
Dealers forge	11.00 to 11.50
Pipe and flues	10.25 to 10.75
No. 1 cast	13.50 to 14.00
No. 1 busheling	11.50 to 12.00
No. 2 busheling	8.50 to 9.00
No. 1 boiler cut	10.00 to 10.50
Boiler punchings	13.00 to 13.50
Cast and mixed boring	7.50 to 7.75
Machine shop turnings	8.25 to 8.75
Railroad malleable	13.75 to 14.25
Agricultural malleable	12.25 to 12.75
Angle bars, splices, etc., iron	16.50 to 17.00
Angle bars steel	12.50 to 13.00
Stove plate and light cast scrap	11.00 to 11.50

Carbon Steel Co. stockholders last week voted to issue $2,000,000 in bonds to take up outstanding bonds and to provide improvements to the plant at Pittsburgh. The company has authorized the expenditure of $100,000 to improve the plant, which operates on high carbon steels and specialties.

CLEVELAND

Tennessee Company Sells at $15

Office of THE IRON TRADE REVIEW,
Penton Bldg., Nov. 12.

Iron Ore. — The very favorable weather has made it possible to continue shipments of ore at a very lively rate, and shippers have taken full advantage of their opportunity. They are getting all the vessels they need and the tonnage moved for the month promises to be even greater than was expected. There has been considerable discussion during the past week concerning ore prices and the changing of the base so as to conform more nearly to average percentages of iron content as shown in recent years. Ore men are confident that they would have no difficulty in obtaining an advance of 50 cents, and also in lowering the guarantee, and some of them advocate more than a 50-cent advance, holding that the prices of 1911 ought to prevail. That year, old range Bessemer was quoted at $4.50, Mesabi Bessemer at $4.25, old range non-Bessemer at $3.70, and Mesabi non-Bessemer at $3.50. Some of the merchant interests are inclined to be conservative in regard to making reservations at the present time.

On base ores with the guarantee of 55 per cent on old range and Mesabi Bessemer, and 51½ per cent on old range and Mesabi non-Bessemer, we quote as follows: Old range Bessemer, $3.75; Mesabi Bessemer, $3.50; old range non-Bessemer, $3.00; Mesabi non-Bessemer, $2.85.

Pig Iron.—The pig iron market in the Cleveland district during the past week has been characterized by strength rather than by activity. Some buyers in the vicinity of Cleveland have purchased Ironton iron on a basis of $17, furnace, for No. 2 foundry, equivalent to $18.55 delivered to foundries. A sale of special analysis iron was made at $17, furnace, for delivery in the Philadelphia district. The Tennessee Coal, Iron & Railroad Co. has sold from 4,500 to 5,000 tons at $15, Birmingham, for No. 2 for second quarter for northern delivery. For delivery during the remainder of the year and the first half of next year, we quote as follows, delivered Cleveland, the higher quotations being for prompt delivery:

No. 1 foundry	$17.75 to 18.75
No. 2 foundry	17.25 to 18.00
No. 2 southern	18.35 to 18.85
Bessemer	17.90
Lake Superior charcoal	19.10 to 19.75
Silveries, 8 per cent silicon	20.55 to 21.55
Bessemer ferro, 11 per cent	26.55

Coke.—It is impossible to obtain prompt delivery of foundry coke except at very high prices and the shortage of cars makes delivery slow. For spot foundry coke, $4.65, ovens, is the usual quotation.

Connellsville furnace coke, $3.75 to $4.00 for prompt delivery, and $2.75 to $3.00 on contract; Connellsville foundry coke, $4.50 to $4.65 for prompt, and $4.00 to $4.25 on contract.

Finished Material. — Deliveries are becoming more extended and some of the leading interests will not now promise deliveries of shapes or plates prior to the third quarter. Some fourth quarter business on structural material is being done. The same interests are unable to deliver steel bars in less than six months. Some eastern mills which have been obtaining high prices for comparatively prompt delivery are not now able to deliver shapes and plates in less than six to 12 weeks. The contract for supplemental piers for the Detroit-Superior bridge has finally been awarded to the Great Lakes Dredge & Dock Co., at $531,849.50. About 4,000 tons of sheet piling will be needed for this work, but the company has a considerable supply on hand and the tonnage which it will buy will not be large. Several hundred tons of reinforcing bars will be purchased. The demand for reinforcing bars is not as heavy as it was and rerolling mills are giving prompt delivery. Bids are going in on a power house for the University of Michigan, at Ann Arbor, Mich., which will involve about 400 tons. The projected addition to the Pontchartrain hotel at Detroit has been abandoned. Bids will also go in next week on an addition to the Industrial Works, Bay City, Mich.

Old Material.—The dullness apparent during election week is still in evidence in the scrap market. The quietness, however, has not brought indications of any weakness with the exception of lower quotations on borings and turnings. Some dealers have lowered slightly their quotation on heavy melting steel, in the hope of including further buying by local steel mills, but the latter are said to have fairly well stocked yards and are not anxious to buy. The outside inquiry for cast scrap continues heavy, and this grade is the most active. The Norfolk & Western railroad closes a list on Nov. 20. We quote, f. o. b. Cleveland, as follows:

Gross Tons.

Old iron rails	$17.75 to 18.50
Old steel rails (under 6 ft.)	15.00 to 15.50
Old steel rails (over 6 ft.)	16.00 to 16.25
Relaying rails	23.50 to 24.00
Old steel boiler plate	12.25 to 12.75
Malleable iron (railroad)	14.50 to 15.00
Steel axles	19.50 to 20.00
Axle turnings	12.50 to 13.00
Malleable iron (agricultural)	13.00 to 13.50
Heavy steel	14.50 to 15.00
Country mixed steel	13.00 to 13.50
Bundled sheet scrap	11.50 to 12.00

Net Tons.

No. 1 R. R. wrought	$15.00 to 15.50
No. 1 busheling	12.75 to 13.25
No. 1 machine cast	13.25 to 13.75
No. 1 dealers' wrought	11.50 to 12.00
Machine shop turnings	8.75 to 9.00
Pipes and flues	11.50 to 12.00
Wrought drillings	9.00 to 9.25
Cast borings	8.50 to 9.00
Stove plate	10.50 to 11.00
Wrought iron piling plate	16.00 to 16.50
Wrought iron arch bars	17.00 to 17.50

TIMELY SUBJECTS

Will Be Discussed at National Founders' Convention.

The 16th annual convention of the National Founders' Association will be held at the Hotel Astor, New York City, Wednesday and Thursday, Nov. 20 and 21. In addition to the usual routine business transacted at these annual gatherings, a number of excellent papers will be presented dealing with safety work in foundries, fire prevention, workmen's compensation, etc. National legislation will be discussed by Marshall Cushing, representative of the association at Washington. Among the topics that will be considered are included, "The Influence of Organized Labor on Legislation," "The Eight-Hour Day on Government Work," "Business Men to Washington—Why?" and "The Investigation by the Government as Contemplated Through the Committee on Industrial Relations." The following papers have been prepared for presentation at that meeting:

"Standardization and Safety Appliances for Foundry Employes," by M. W. Alexander, General Electric Co., Lynn, Mass.

"Practical Efficiency," by Staunton B. Peck, Link Belt Co., Chicago.

"Fire Prevention or Fire Insurance for Foundries," by Franklin H. Wentworth, Boston.

"What is Doing in Workmen's Compention?" by G. W. Mixter, Moline, Ill., and Miles Dawson, New York City.

On Wednesday evening, there will be a subscription banquet at the Hotel Astor, at which Henry W. Hoyt, of Detroit, will preside.

CINCINNATI

Buyers and Sellers Await Developments

Office of THE IRON TRADE REVIEW,
503 Mercantile Library Bldg., Nov. 12.

Pig Iron.—The buying and selling movement during the past week has been very slow, with small prospects of a betterment of conditions during the week to come. This has been brought about by the fact that most of the melters have covered for their requirements for this year, and are waiting to see what will develop in the market after the first of January before making any further purchases. The furnaces, also, in many instances are not actively soliciting business, except those which will go into blast soon, as they are uncertain as to what conditions will arise during the first half of 1913 in the way of prices on pig iron, ore and coke, and the obtaining of the latter two in satisfactory quantities. It is quite probable, therefore, that no large amount of business will be done this year.

Prices in the south have not changed, but appear to have gained a little strength. Iron to be had among the Tennessee furnaces for last quarter shipment at $13.50, Birmingham, is still in evidence, and one Alabama stack recently made a special sale of a good tonnage at this same figure. Furnaces in the Birmingham district, however, are generally holding firm at $14 to $14.50, for spot or this year's shipment, and one Tennessee stack is also holding at $14.50, Birmingham basis, for any delivery. Prices for the first half of next year range from $14 to $15, Birmingham, in both states.

In southern Ohio, the recent lull has not given the furnaces an opportunity to advance their prices, and they remain fairly strong at from $16.50 to $17, Ironton, for delivery from the present time through the first and second quarters of 1913. Malleable and basic iron are both scarce, and the demand lately has been largely for these grades. The coke situation is giving furnaces in this district much trouble, as they are finding it a hard matter to obtain enough to keep in blast.

A sale of 1,000 tons of basic iron was made to a Detroit melter during the past week at a price not over $16.50, furnace. General inquiries are scarce, and include 500 tons of malleable iron from the south for first half delivery; 100 tons of silvery from northern Ohio for prompt shipment, and 3,000 tons of southern forge iron for first half shipment. With freight rates $3.25 from Birmingham, and $1.20 from Ironton, we quote Cincinnati prices as follows:

Southern foundry No. 1	$17.25 to 18.00
Southern foundry No. 2	16.75 to 17.75
Southern foundry No. 3	16.25 to 16.75
Southern foundry No. 4	16.00 to 16.50
Southern gray forge	16.00 to 16.25
Mottled	15.25 to 15.75
Southern No. 1 soft	17.25 to 18.00
Southern No. 2 soft	16.75 to 17.75
Standard southern car wheel	31.00 to 31.50
Northern No. 2	17.70 to 18.20
Northern No. 3	17.20 to 17.70
Northern No. 4	16.95 to 17.45
Silveries 8 per cent silicon	20.20 to 21.20

Coke.—The coke market is uncertain and spot prices depend largely upon the conditions of the sale. Not many large sales are being made on contract furnace coke, as the furnace interests state that they cannot afford to pay present prices for future shipment in view of the prices for which they have contracted for their output of pig iron. Some abnormal prices have been paid on spot foundry coke in cases of necessity, the ovens sometimes holding above the general prices of from $4.50 to $4.75 per ton. There is a scarcity of coke, especially in the Pocahontas district, and much trouble is being experienced due to the scarcity of labor and railroad equipment. We quote below from the leading coke producing districts as follows:

Connellsville district:	Prompt shipment.	Contract.
Foundry coke	$4.50 to 4.75	$3.75 to 4.00
Furnace coke	3.85 to 4.25	3.00 to 3.50
Wise county district:		
Foundry coke	$4.00 to 4.25	$3.75 to 4.00
Furnace coke	3.50 to 4.00	3.25 to 3.75
Pocahontas district:		
Foundry coke	$3.75 to 4.00	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00
New River:		
Foundry coke	$3.75 to 4.25	$3.25 to 3.75
Furnace coke	3.25 to 3.75	2.75 to 3.00

Finished Material.—The local rolling mill is running at full capacity, having contracts on its books that will consume its output up to next March. There is no apparent let-up on specifications being received, and trouble is being experienced in making shipments on time. Prices are being held firmly at 3.45c to 3.50c, Pittsburgh basis, for galvanized, and 2.30c for black sheets, both No. 28 gage. Steel bars are 1.40c to 1.45c, and structurals, 1.50c to 1.55c, Pittsburgh basis, with most of the larger mills practically out of the market. It is reported that some of the smaller eastern makers are offering bars and structurals at from 10c to 20c higher than the above prices for spot shipment.

Warehouse business continues good, especially on building materials, as most of the contractors who have buildings in the course of construction, are anxious to get under cover before the bad weather sets in. Stocks in yards are hardly large enough to meet the demand at present. We quote below warehouse prices, f. o. b. Cincinnati as follows:

Steel bars, 2c base; iron bars, 1.95c base; structurals, 2.10c base; plates, ¼ inch and over, 2.10c base; sheets, blue annealed, No. 10, 2.25c, base; rivets, cone head, 2.60c, base; cold rolled shafting, 58 per cent discount; steel hoops, 2.10c base, full extras; boiler tubes as follows: 1½ inch, 46 per cent discount; 1¾ to 2¼ inch, 57 per cent discount; 2½ inch, 60 per cent discount; 2¾ to 3¼ inch, 65 per cent discount; 3½ to 4½ inch, 68 per cent discount; 5 to 6 inch, 60 per cent discount; soft steel cold twisted concrete bars, cut to length as follows: ¾ inch square and larger, 2.15c; ⅝ inch square and larger, 2.25c; ½ inch square and larger, 2.35c; 5-16 to ⅜ inch square and larger, 2.55c; and ¼ inch square and larger, 2.65c.

Old Material.—The scrap iron market is uncertain, and as a result, there is not much of a buying and selling movement in evidence. Dealers are refusing to add much of a tonnage to stocks already in their yards, because of the possibility that prices may recede further within a short time. There are rumors of another decrease to come before the first of next week, but they are hardly justifiable. Heavy melting scrap is holding fairly well at from $12.50 to $13 per gross ton, and cast borings and heavy turnings have been selling at from $8.50 to $9 each per net ton. We quote below prices dealers will pay, and also dealers' selling prices in Cincinnati and vicinity as follows:

Gross Tons

Old iron rails	$14.25 to 14.75
Old steel rerolling	12.50 to 13.00
Old iron axles	18.75 to 19.25
Heavy melting scrap	12.50 to 13.00
Relaying rails	21.75 to 22.50
Bundled sheet scrap	9.50 to 10.00

Net Tons

Old No. 1 R. R. wrought	$11.75 to 12.25
No. 1 machinery cast	12.00 to 12.50
No. 1 busheling	10.00 to 10.50
Stove plate	8.75 to 9.25
Machine shop turnings	8.00 to 8.50
Cast borings	8.50 to 9.00
Heavy turnings	8.50 to 9.00
Mixed cast	11.00 to 11.50
Malleable	8.25 to 8.75

PHILADELPHIA

No Effect of Election in the East

Office of THE IRON TRADE REVIEW,
Philadelphia, Nov. 12.

Presidential election results have produced little or no effect upon the eastern iron and steel market. Certainly there has been no diminution of tonnage or slackening of the heavy rate of mill operations. On the contrary, some makers of finished lines report a heavier tonnage last week than for several weeks previous. Eastern iron mills continue to book heavily in bar iron, muck bar and other iron products, due in some measure to the tangled condition of steel mill deliveries. Finished steel materials are moving strongly, but deliveries show no improvement. The pig iron market is not widely active, but is strong and healthy. Forge iron of all classes is in demand. Eastern makers are not much concerned with the possibility of foreign iron being imported at present prices. Old material is quieter. An incipient strike at the plant of the Alan Wood Iron & Steel Co., Conshohocken, Pa., was adjusted by the men being granted an advance. The mills resumed this week.

Pig Iron.—An active demand for forge iron, both for puddling and for cast pipe purposes, continues a leading feature of the eastern market. Eastern iron mills, as already noted, are entering upon a period of more profitable and active operations, due to the impossibility of obtaining early deliveries from the steel mills and they are requiring a heavier tonnage of forge iron. Some additional sales of fair size have been made at the range of $17.50 to $17.75, delivered, eastern Pennsylvania, and eastern furnaces have also sold several thousand tons for western shipment at profitable prices. A sale of 500 tons under special conditions was done at $18.40, delivered, and another lot of 500 tons at a slightly lower price. One eastern consumer is inquiring for 1,000 tons of special forge and several other thousand lots are pending. A pipe maker is out for 5,000 tons of No. 3 and forge for first quarter. Some southern forge is being offered in the east at $13.75, Birmingham, or $17.95 along the Delaware river. Reports from abroad that eastern pipe makers are inquiring there for forge have aroused no apprehension among domestic makers as to possible importations of foreign iron because the latter is not competitive at present even with a drawback of the duty on re-export business. Middlesbrough, English, No. 2 was offered in the east in the week at $18.65, exduty. Eastern foundry grades show a fair movement at from $17.50 to $17.75, furnace, for No. 2X, or $18.25 to $18.50 for No. 1X. Some small sales have been made 25 and even 50 cents higher, Philadelphia. A Trenton consumer is inquiring for 3,000 tons of No. 1 and No. 2 plain for the next five months. Basic iron shows some demand. A central Pennsylvania buyer is out for 3,500 tons for first quarter. An unreported sale of 2,000 tons of prompt basic at about $17.75, delivered, made two weeks ago, has come to light. The week in low phosphorus iron has been quiet, but this grade is very strong. A small sale at $23.90, Philadelphia basis, is reported. A New Jersey buyer which recently inquired for a round block has practically closed with an eastern maker for its forward requirements. A buyer in this district has closed for about 1,500 tons of malleable for first quarter. The No. 1 Crane furnace has gone in on low phosphorus and the Everett, Pa., stack is about to resume on foundry. The monthly meeting of the Eastern Pig Iron Association, held the past week, showed very satisfactory statistical conditions. Unfilled orders, which have been large, were almost identical with the previous month. Stocks, already low, were slightly reduced.

We quote for delivery this year to consumers' plants in Philadelphia and vicinity, unless otherwise specified, as follows:

Eastern Pa. No. 1X foundry	$18.50 to 18.75
Eastern Pa. No. 2X foundry	18.25 to 18.50
Eastern Pa. No. 2 plain	18.00 to 18.25
Standard forge (Eastern Pa.)	17.50 to 17.75
Basic (Eastern and Central Pa.)	18.00 to 18.25
Virginia No. 2X	18.65 to 18.80
Southern No. 2	18.00 to 18.50
Malleable	19.50 to 19.75
Low phosphorus, Philadelphia	23.50 to 24.00

(First Quarter.)

Malleable	$19.50 to 19.75
Basic	18.00 to 18.25
Eastern Pa. No. 2X foundry	18.25 to 18.50
Eastern Pa. No. 2X plain	18.00 to 18.25
Standard gage (Eastern Pa.)	17.50 to 17.75
Virginia No. 2X	18.65 to 18.80
Low phosphorus, Phila	23.50 to 24.00

Iron and Steel Bars.—Some heavy sales of bar iron and muck bar have been made by eastern mills during the past week or 10 days and there is an active inquiry for both. The prices have been usually around 1.60c mill, on bar iron and $33, Pittsburgh, for muck bar. One eastern Pennsylvania buyer took 1,000 tons of muck bar. A middle western mill has closed for 10,000 tons of bar iron, a considerable part of which went to the Lenoir Car Works, Lenoir City, Tenn. Leading steel bar makers either are not quoting at all at the general 1.40c, Pittsburgh, price or are accommodating only regular customers, but even in these cases deliveries run three months or more. Prompt steel bars in less than car loads are selling at 1.85c, Philadelphia, or 1.70c, Pittsburgh. Some cancellations of steel bar orders have been made because of prolonged deliveries.

We quote for delivery to consumer's plants in Philadelphia and vicinity: Steel bars at 1.55c to 1.60c on contract and common bar iron at 1.67½c to 1.77½c. Prompt steel bars on mill shipments are quoted at 1.75c to 1.85c and from store are quoted at 2c to 2.15c. Cut nails are quoted from $1.85 to $1.90, Philadelphia.

Shapes and Plates.—The going market in the east, that is, for shipment in five to 10 weeks, continues at a minimum of 1.60c, Pittsburgh, or 1.75c, Philadelphia, on both plates and shapes. These prices are being made by eastern producers, as Pittsburgh and middle western makers are practically out of the market except for months ahead. On contracts, first quarter represents about as far ahead as eastern makers will do at their ruling schedules and they are not anxious for such business either. The tonnage of specifications is heavy and unfilled bookings are further increasing in some cases. There have been a few cases of cancellation of plate orders in the east because of drawn-out deliveries, but this business has usually been placed elsewhere. The American Bridge Co. will fabricate 3,500 tons for the Balboa, Panama, shops, taken through the United States Steel Products Co., and has also taken the steel for the Tutweiler hotel, Birmingham, Ala., about 3,000 tons. The Tutweiler apartment in the same city is pending. Bids have gone in on a stock house for the

brewery of Bergner & Engle, this city, 700 tons. The Southern railroad has been inquiring for 2,500 tons of plates, angles and bars. A large merchant vessel is up for figures.

We quote delivered to consumer's plants in Philadelphia and vicinity: Sheared steel plates, 1.65c to 1.75c; universal steel plates, 1.65c to 1.80c; structural shapes, 1.65c to 1.80c. Plates and shapes from store are quoted at 2.15c to 2.25c.

Sheets.—A heavy tonnage in sheets continues to come to leading eastern producers on contracts and deliveries are falling back. Eastern makers usually obtain considerable advance over the schedules of the larger Pittsburgh mills. The eastern Pennsylvania plants have heavy tonnages booked.

We quote for delivery to consumer's plants in Philadelphia and vicinity, No. 10 gage blue annealed sheets at from 1.90c to 2.00c.

Semi-Finished Steel.—Eastern steel makers who have been active sellers of billets and slabs have become more conservative in offering further tonnage because of the continuance of the present shortage in crude steel and their own heavier demands. Bessemer billets were quoted this week at $30, Eastern mill. Some eastern steel companies continue to inquire for tonnages of slabs and other forms of crude steel.

We quote delivered to consumer's plants in Philadelphia and vicinity 4 x 4-inch open-hearth and Bessemer rolling billets at $28.50 to $30.50 and forging billets at from $34.50 to $38.50.

Old Material.—The market in old material in eastern Pennsylvania is quiet, as consumers, with ample stocks, show no haste to close negotiations and are usually offering slightly lower prices to dealers. On heavy melting steel, $15.50, delivered, is their usual offer at present, though $16, delivered, was recently done. Railroad wrought is easier on mill offers, but the recent railroad lists brought good values. Borings are in demand, a number of sales having been done at $11.75, delivered, and a few at $12, delivered. Consumers continue to freely pay $19, delivered, for shafting. Steel axles are strong.

We quote gross tons delivered to consumers' plants in eastern Pennsylvania and western New Jersey, as follows:

Old iron rails	$18.50 to 19.00
Old steel rails (rerolling)	17.00 to 17.50
No. 1 heavy melting steel	15.75 to 16.00
Old car wheels	15.00 to 15.50
Old iron axles	24.00 to 25.00
Old steel axles	19.50 to 20.50
No. 1 railroad wrought	17.25 to 17.75
Wrought pipe	14.00 to 14.50
Cast borings	11.50 to 12.00
Machine shop turnings	11.50 to 12.00
Heavy cast	14.50 to 15.00
Malleable	13.25 to 13.50
Stove plate	11.50 to 12.00
No. 1 forge	14.00 to 14.50
Low phosphorus	19.00 to 19.50

Freight rates per ton on scrap from Philadelphia to principal eastern consuming points are: $0.60 to Ivy Rock, Pa.; $0.65 to Phoenixville, Pa.; $0.80 to Coatesville, Pa.; $0.85 to Bethlehem, Pa., Reading, Pa., and Roebling, N. J., $1.10 to Pottsville, Pa., Lebanon, Pa., and Columbia, Pa.; $1.20 to Harrisburg and Steelton, Pa.; $1.40 to Milton, Pa.

NEW YORK

Market is Quiet But Strong

Office of THE IRON TRADE REVIEW, 1115 West Street Bldg., Nov. 12.

Iron Ore.—There is general expectation expressed in the east that the 1911 schedule of prices will probably be adopted by Lake Superior interests for the coming season and some of the leading eastern domestic miners are contemplating similar action. Recent sales of Bathhurst, Nova Scotia, ore to eastern Pennsylvania consumers indicate an increased movement of this material to this country next year. Including recent sales and term contracts, from 50,000 to 60,000 tons of this ore are now under sale. The price fixed on this ore for next year is 7¼ cents per unit, Philadelphia. No Annapolis, New Brunswick, ore is being offered to this country for next year, as foreign consumers are receiving all the material exported. Small shipments of Venezuelan ore continue to be negotiated. An easier condition of freight from Mediterranean points is shown by the charter of the steamer Heronspool, with a cargo of 5,000 tons from Sagunto or Agua Amarga, Spain, to Philadelphia, at 9s 6d. This is the same level paid between these ports on the last previous charter, which, however, was some time ago and, in the interval, freights generally have advanced. Difficulty in getting full vessel tonnage is being encountered by Cuban and other ore shippers.

Pig Iron.—Quiet conditions predominate in the iron market in the metropolitan district. The present lack of new buying seems to have arisen, not from the result of the presidential election, but from the fact that consumers have their requirements well in hand. The tone of the market generally is of firmness and strength. A New Jersey consumer of special machinery divided an order for 1,800 tons of No. 1 and 1,800 tons of No. 2 plain foundry for first half among several eastern makers. The high silicon iron went around $18.50, delivered, or $17.75, at the selling furnace and the No. 2 plain at about 25 cents less. Another Jersey consumer is inquiring for 500 tons of foundry and some high silicon Bessemer for second quarter and a soil pipe maker is still carrying on negotiations for a round block. An eastern Pennsylvania pipe maker has initiated a new negotiation for 5,000 tons of No. 3 southern and several lots of this character are now pending in that district. Buffalo makers are receiving a liberal inquiry from Canadian consumers and have made a number of sales at domestic prices. A new inquiry for 3,000 tons of No. 3 southern for export to Genoa, Italy, has appeared and total inquiries of this kind now reach about 10,000 tons. The chances for obtaining any of this business apparently lie exclusively with southern makers. Eastern Pennsylvania No. 2X prices are usually from around $17.50 to $17.75, furnace, or from $18.25 to $18.50, tidewater. The Bethlehem Steel Co. continues to be a seller of pig iron, but it is confining its activity largely to its regular customers. Some Virginia makers are quoting from $16.25 to $16.50, furnace, for early shipment No. 2X. Several changes in furnace operations are noted. The Standish, N. Y., furnace which has been idle for a few weeks for repairs, is resuming. In Virginia, the Buena Vista stack and one of the Low Moor furnaces are going into blast, but the Covington furnace is blowing out. We quote for delivery over the remainder of the year, at New York tidewater, as follows:

Northern foundry No. 1	$18.50 to 18.75
Northern No. 2X foundry	18.25 to 18.50
Northern No. 2 plain	18.00 to 18.25
No. 2 Virginia	18.80 to 19.20
No. 2 southern foundry	18.25 to 18.50
Malleable	19.00 to 19.25
Gray forge	17.50 to 17.75

(First Quarter.)

Northern No. 2X foundry	$18.25 to 18.50
Northern 2 plain	18.00 to 18.25
No. 2X Virginia	18.80 to 19.20
No. 2 Southern	18.25 to 18.75

Ferro-Alloys.—Both English and German makers of ferro-manganese as a rule are not disposed under present conditions to offer additional tonnages on contract before the second half at the ruling price of $61, but several sales were put through this week at this price for earlier deliveries. An eastern steel company has taken 1,000 tons for second and third quarters and an Ohio steel maker 500 tons for first half, both at $61, seaboard. Prompt ferro-manganese commands from $70 to $75, seaboard, and carload sales at the latter figure are noted. Pending inquiries for this alloy amount to about 1,500 tons, the largest of which is 600 tons. A middle western consumer is inquiring for 600 tons of ferro-chromium and from 250 to 300 tons of 50 per cent ferro-silicon are also pending.

We quote standard English 80 per cent ferro-manganese at from $70 to $72, seaboard, for early shipment and at $61, seaboard, for delivery after Jan. 1 and 50 per cent ferro-silicon on contract at $75, Pittsburgh or Philadelphia for carloads, $74, for larger lots, and $73, for 600 tons or more.

Plates.—The eastern market on plates on new business to be delivered within the next several months continues on a minimum of 1.60c, Pittsburgh, or 1.76c, New York. Some first quarter contracting is being done, but the makers able to handle this business are not very desirous of committing themselves ahead. The 1.50c, Pittsburgh, price of the larger interests remains the market value only for many months ahead and usually to regular customers only. The heavy demand for plates originating from the equipment buying of the railroads is unabated. The car market continues very active. Orders of the week include 1,000 55-ton gondolas for the Pittsburgh & Lake Erie railroad to the Standard Steel Car Co.; 800 box cars to the American Car & Foundry Co., and 50 gondolas to the Ralston Car Co., for the New York, Philadelphia & Norfolk; 3,000 underframes for the St. Paul system to the Bettendorf Axle Co. The Louisville & Nashville railroad, which has been inquiring for 1,200 underframes, has decided not to buy at present.

We quote, delivered at New York tidewater on going business, for last quarter or first quarter, 1.76c. New York, on sheared plates. Some makers are asking $1 higher for universal plates. Plates from store are quoted at 2.15c.

Structural Shapes.—Eastern shape mills on any assorted tonnages cannot deliver before 10 to 12 weeks and for such shipments they are asking 1.60c, Pittsburgh, or 1.76c, New York, or higher. The 1.50c, Pittsburgh, price among eastern makers has practically disappeared and this quotation of Pittsburgh district sellers remains largely nominal as far as early deliveries. Eastern structural buyers are now generally inquiring for spring delivery. Many of the mills would welcome a decline in building work and a consequent lightening of pressure upon them for steel which is expected to come with the winter months.

Fabricated lettings are moderate. The Pennsylvania Steel Co. has taken 5,000 tons for a bridge for the Pennsylvania lines West, 500 tons for four small bridges on the Maryland division and on the main line of the Pennsylvania railroad, and will furnish 1,200 tons for the Long Island railroad originally placed with the Fort Pitt Bridge Co., as reported; Levering & Gerrigues have 950 tons for the Brooklyn Union Gas building, Brooklyn; the Wm. Hauptman Iron Works 750 tons for the Robertson apartment, Ninety-fifth street and Broadway; the Radley Steel Construction Co. 600 tons for the Brown Bros. Co. apartment, 105 and 109 West Seventy-second street; the McClintic-Marshall Construction Co., 925 tons for a bridge over the Pedee river, in North Carolina, for the Raleigh, Charlotte & Southern railroad. The Tutweiler hotel, Birmingham, Ala., taken by the American Bridge Co., will require about 3,000 tons. Plans are out for two buildings for the American Express Co., one on Broadway and one on Forty-fourth street, to require about 2,000 tons and 1,500 tons, respectively. Another large project soon to be out for bids is the new Lord & Taylor store up town. The Freundshaft Society club house, Fifty-fourth street and Seventh avenue, about 1,000 tons, is held up. New bids are being taken for addition to the Prince George hotel, Twenty-eighth street, 500 tons. The Cruishank warehouse, Horatio and Gansevort streets, 1,500 tons, may go over for some time. Bids have been taken by the Delaware, Lackawanna & Western railroad for 3,000 tons of bridge work for next year's shipment and will go in Nov. 26 on 600 tons for a bridge over the Oswego canal, Phoenix, N. Y. The United States Steel Products Co. has taken an order for 4,000 tons of line pipe for the Huasteca Oil Co., of Mexico.

We quote for New York delivery as follows: Structural shapes, 1.66c to 1.76c. Structural shapes from store, 2.15c.

Iron and Steel Bars.—Eastern iron mills are receiving an increasing volume of business in bar iron and other iron products, and are profiting from the delayed deliveries in steel bars. The eastern bar iron market seems to be well settled at a basis of 1.60c, mill minimum. Steel bar deliveries are so far extended that buyers are obliged to either pay sharp premiums to the smaller mills, or take from store to satisfy early needs.

We quote for New York delivery, steel bars at 1.56c and common iron bars at 1.65c to 1.70c. Steel bars from store are quoted at 2 cents.

Rails and Track Material.—The New Haven system has closed for its rail requirements for next year, aggregating 65,000 tons, which were divided among the Pennsylvania, Bethlehem and Lackawanna steel companies. The Southern railroad has closed for 25,000 tons with the Tennessee Coal, Iron & Railroad Co. The Canadian Pacific Railroad is inquiring on this side for 50,000 tons, the filled-up conditions of the domestic mills forcing it to turn to other sources of supply. The Brooklyn Rapid Transit Co. has placed 2,000 tons of girder rails with the Pennsylvania Steel Co. and 2,000 tons with the Lorain Steel Co. and the New York Railways Co. has divided 1,300 tons of girder rails between the same mills. The Pennsylvania Steel Co. has taken 1,500 tons for the Chicago & Alton, 1,500 tons for the Chicago Great Western and 3,000 tons for a Chicago terminal road, all of Mayari Bessemer. The East Texas Traction Co. is negotiating for 5,500 tons.

Cast Iron Pipe.—Reports of some large inquiries for export are current in the market, but details are lacking. The Standard Cast Iron Pipe & Foundry Co. has taken 3,000 tons of 6 to 30-inch pipe for Providence, R. I. The board of water supply, gas and electricity of New York, is inquiring for 2,300 tons of 6, 8 and 12-inch pipe for the borough of Richmond to close Nov. 20. The strong demand from private buyers continues and a number of these are inquiring for their requirements for next year. Prices are fairly firm, and incline higher.

We quote six-inch pipe at from $23.00 to $24.00, f. o. b. New York, in carload lots.

Old Material.—Conditions are easier in old material and there is more bearish sentiment among buyers, some of which is apparently put forth for effect, as fundamental conditions continue sound and strong. Consumers are making lower offers and dealers have dropped their prices for some grades. An eastern Pennsylvania steel maker took 10,000 tons of heavy melting steel just before election at a reported high price, but the best offers are now around $15.50,

eastern Pennsylvania. A local market has developed for borings at $11.-75, delivered, consumer's price. Heavy cast shows firmness. We quote, gross tons, prices New York dealers will pay at tidewater, as follows:

Old car wheels	$13.50 to 13.75
Old iron axles	22.00 to 22.50
Steel axles	17.00 to 17.50
Old steel shafting	16.00 to 16.50
No. 1 heavy melting steel	13.00 to 13.25
No. 1 R. R. wrought	15.00 to 15.50
Wrought pipe (not galvanized)	11.25 to 11.50
Cast borings	9.50 to 10.00
Machine shop turnings	9.75 to 10.00
Heavy cast	11.75 to 12.25
R. R. malleable	10.50 to 10.75
Stove plate	9.25 to 9.50
Grate bars	8.25 to 8.50

Freight rates on scrap per ton to Steelton, Pa., Columbia, Pa., Pottsville, Pa., and Harrisburg, Pa., are $1.50 from Jersey City, and $2.00 from New York; to Coatesville, Pa., Ivy Rock, Pa., Phoenixvile, Pa., and Reading, Pa., $1.50 from Jersey City, and $1.80 from New York; to Bethlehem, Pa., $1.10 from Jersey City, and $1.60 from New York; to Roebling, N. J., $1.00 from Jersey City, and $1.50 from New York; to Milton, Pa., $1.60 from Jersey City, and $2.00 from New York; to Jersey City, $1.00 from New York; to Newark, $1.10 from New York

BUFFALO

Increased Activity Follows Election

Office of THE IRON TRADE REVIEW, Buffalo, Nov. 12.

Pig Iron.—The sales for the week amounted to between 12,000 and 15,000 tons of all grades, with a considerable inquiry remaining to be satisfied. While on the surface there does not appear to be very much activity, there is a marked activity in getting out shipments in order to keep the foundries of the district and section sold supplied with the amount of iron they require. Nothing of a retarding nature has manifested itself as a result of the recent presidential election. In fact, a canvass of producers and consumers alike indicates an established feeling that business will continue good for many, many months to come. As an evidence of this prices have stiffened, and on No. 1 foundry and malleable have joined basic in reaching the $18 point for the maximum of the range. There are instances where specifications were held back for considerable tonnages, pending the outcome of the election and several of these consumers are now coming forward freely with their specifying on contract. This ordering is being done upon a confidence becoming more and more established in the trade that an era of extensive railroad buying and building and expansion will cover a considerable period, as an outcome of the election.

The range for the week, f. o. b. Buffalo, is substantially as follows:

No. 1X foundry	$17.50 to 18.00
No. 2X foundry	17.25 to 17.50
No. 2 plain	17.00 to 17.25
No. 3 foundry	17.00 to 17.25
Gray forge	16.75 to 17.00
Malleable	17.50 to 18.00
Basic	17.50 to 18.00
*Charcoal	18.75 to 21.25
*Some grades and brands	22.00

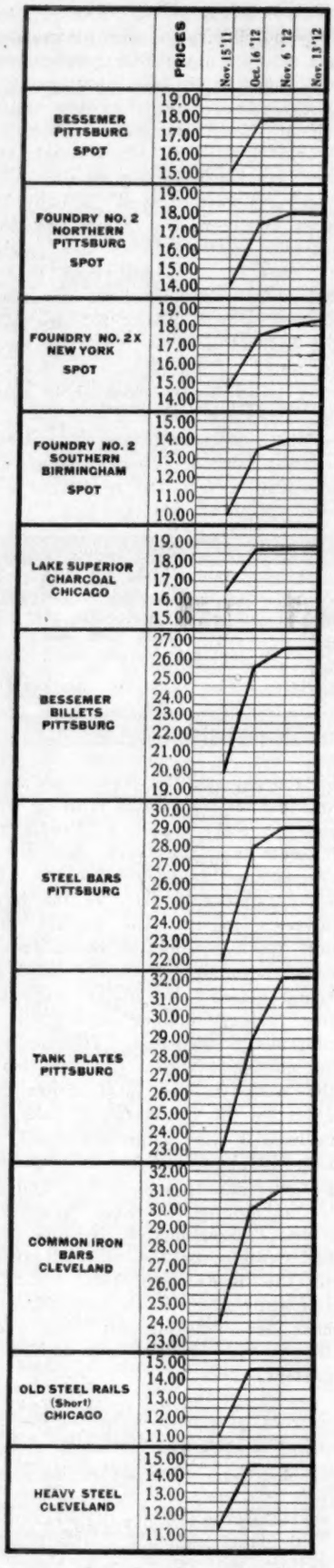
Finished Material.—The market here continues unchanged since the election. Specifications are coming in freely against contracts and the mills continue to be pressed to get out urgent orders for contract customers. Users are taking out their full allotments and while the mills are holding firmly to the monthly quotas, for the most part, there are a few cancellations of tonnnge on this account. Prices remain rigid but unchanged, and deliveries are still removed three and four months. This is causing the consumers to get in their specifications as far ahead as possible. Structural is being ordered ahead for delivery at the convenience of the mills, in some instances extending into third and fourth quarter of next year. The demand for wire and wire products is such that another advance is expected before the end of the current quarter. The demand for sheets continues good, particularly galvanized.

The Riter-Conley Mfg. Co., Pittsburgh, secured the contract for the structural steel in the plant addition of the Pennsylvania General Electric Co., at Erie, Pa., requiring about 1,500 tons. Bids will be opened today by the state for the Erie barge canal terminals at Rome, N. Y., for 500 tons of sheet steel piling.

Old Material.—The scrap market has experienced a slight slackening since the election, but this is looked upon as being a coincidence rather than the cause, as the consumers of the district seem, at this time, to be pretty well stocked. The lessened activity, particularly from eastern Pennsylvania, has caused prices to soften, but not to an extent to make any changes in the schedule quoted last week. While trade out of the district has been less, the local market has continued to show a fair demand in practically all the lines. The range for the week, for gross tons, f. o. b. Buffalo, is as follows:

Heavy melting steel	$14.75 to 15.25
No. 1 railroad wrought scrap	15.75 to 15.25
No. 1 R. R. and mch. cast sc'p.	14.00 to 14.50
Old steel axles	16.00 to 16.75
Iron axles	23.50 to 24.00
Car wheels	15.50 to 16.25
Railroad malleable scrap	13.75 to 14.25
Wr'ght iron and soft steel turn.	8.75 to 9.00
Cast iron borings	8.00 to 8.50
Low phosphorus steel scrap	17.00 to 17.50
Old iron rails	15.50 to 16.00
Tank iron	10.75 to 11.25
Boiler plate, sheared	15.00 to 15.50
Pipe and tank	10.50 to 11.00
Stove plate	11.25 to 11.75
Sheet iron	7.75 to 8.25
Locomotive grate bars	11.75 to 12.25

PRICE CHART



BIRMINGHAM

Highest Prices So Far Recorded

Office of THE IRON TRADE REVIEW,
Birmingham, Ala., Nov. 12.

Pig Iron.--The feature of the market is the continued strong demand for delivery against contracts previously entered, and the manifested disposition of the producing interests as to commitments for delivery after the first quarter of next year. Actual trading has been very light for some three to five weeks past, but prices have not weakened as a result. Within the past week, spot deliveries sold at $15 per ton, Birmingham, or at the highest figures so far recorded in the advance, although the tonnage involved at such prices is not sufficient to afford a test of values. The largest sale reported for the week was a lot of 2,000 tons of No. 2 foundry, for delivery prior to the second quarter, which sold at $14.50 per ton, Birmingham. A number of car loads, and lots of 100 to 150 tons each, were also sold at $14.50 per ton Birmingham, and no mention is made of any sale in the week at lower figures. It is noted that the sales made covered a very wide territory, and that actual requirements were provided for in the majority of cases. As to just what can now be done on deliveries through the first half, where a round tonnage was offered in definite form, a positive statement cannot be made. From the production and forwarding reports so far in hand, the producing interests were in no better shape for entering additional tonnage on Nov. 1 than on Sept. 1, and carried over approximately the same tonnage due on prior deliveries. The actual production for October was some 6,000 tons larger than for September, and stock returns will no doubt show that a larger reduction was made in the aggregate accumulation during October than during the month previous. In view of such conditions, it is considered unusual that no more interest is being manifested by the trade in advanced requirements. The furnace records indicate that the trade is hardly covered through the first quarter, and in many instances the largest consumers are asking that deliveries engaged be anticipated; yet, the inquiry pending is in very small volume, and even those concerns which are buying on the open market are apparently unwilling to close for stipulated tonnages at the figures now ruling. The selling interests are to all appearances quite content with the conditions existing, and so far as is known, are not making solicitations in any quarter of the trade. With the market quiet comparatively, the schedule of prices below is quoted for the remainder of the year and through the first quarter, viz.:

For delivery during the remainder of this year and first quarter next:

No. 1 foundry	$14.50 to 15.00
No. 2 foundry	14.00 to 14.50
No. 3 foundry	13.50 to 14.00
No. 4 foundry	13.00 to 13.50
Gray forge	12.50 to 13.00
Mottled	12.00 to 12.50
Standard basic	13.50 to 14.00
Off basic	11.00 to 11.50
Standard charcoal	24.50 to 25.00

With the exception of charcoal iron, an advance of 25c to 50c per ton would be asked over the above figures for deliveries in the last quarter.

Cast Iron Pipe.—Shipments from local plants during the month of October exceeded the production substantially, and the volume of new business being placed is satisfactory. The most significant of recent orders is a lot of 1,000 tons of 12 to 42-inch water pipe for the requirement at Dallas, Tex., and the same tonnage of 6 to 20-inch water pipe for the requirement at Port Arthur, Tex. Both lots mentioned were awarded the United States Cast Iron Pipe & Foundry Co., and are being furnished from local plants. For large municipal requirements, the following prices are being fully maintained, per net ton, f. o. b. cars Birmingham, viz.: Water pipe, 4-inch, $24.50; 6-inch and up, $22.50, with $1 per ton extra for gas pipe. For small lots placed for repairs and extensions, an advance of $1 to $1.50 per ton over the above figures is asked, while special fittings are quotable at $50 to $55, per ton, at Birmingham.

ST. LOUIS

Pig Prices Firm in a Dull Market

Office of THE IRON TRADE REVIEW,
St. Louis, Nov. 12.

Pig Iron.—Sales and inquiry for pig iron for the last 10 days have been limited to small lots for spot shipment, and there is almost no inquiry out today. Prices are very firm, however, with a strong tendency to advance, and stocks of iron are low. One sale was made Friday of 50 tons of ferro-manganese at $75, Baltimore, as against a price of $58 last July. One sales agent was notified this morning by the furnace he represents to put No. 3 southern pig iron at $14 a ton for delivery over the remainder of the year. Northern No. 2 is firm at $18, f. o. b. furnace, Chicago, and at $16.50 to $17, Ironton, for any delivery up to July 1, next.

Prices on southern iron, delivered, to which the freight of $3.75 from Birmingham has been added, follow:

Southern No. 1	$18.25 to 19.25
Southern No. 2	17.75 to 18.75
Southern No. 3	17.50 to 18.50
Southern No. 4	17.25 to 18.25

Coke.—Good inquiry is coming in for quotations to fill contracts for 1913, but sales agents are not making any prices. Actual buying has been limited recently to small lots for prompt delivery. Prices remain firm as follows:

We quote 72-hour Connellsville foundry grades, $4.50 for immediate shipment or delivery through the year; 48-hour Connellsville furnace, $4.00; best 72-hour Virginia foundry, $3.75 to $4.00; 48-hour Virginia furnace, $3.25 to $3.50. The freight to East St. Louis and St. Louis is $2.80, and $2.70 from the Virginia fields when shipment is destined beyond St. Louis.

Old Material. — The demand for scrap iron, especially for relaying rails, is exceptionally good, and prices are strong. The mills are using large quantities of scrap, and while they are not buying much, dealers know they will be in the market soon, and are paying good prices for all they can get. Prices which dealers are willing to pay for scrap, f. o. b. St. Louis, follow:

Gross Tons

Old car wheels	$15.00 to 15.50
Old iron rails	15.50 to 16.00
Rerolling rails (5 ft. and over)	14.50 to 15.00
Old steel rails (3 ft. and und.)	14.00 to 14.50
Light section relayers (45 lbs. and under, subject to inspec.)	24.00 to 25.00
Relaying rails, subject to insp.	24.00 to 25.00
Frogs, switches and guards cut apart	14.00 to 14.50
Heavy melting steel	14.00 to 14.25
Shoveling steel	12.00 to 12.50

Net Tons

No. 1 railroad wrought	$13.00 to 13.50
No. 2 railroad wrought	12.50 to 13.00
Arch bars and transoms	15.50 to 16.00
Knuckles, couplers and springs	12.50 to 12.75
Shafting	17.00 to 17.50
Iron car axles	20.00 to 21.00
Steel car axles	17.50 to 18.00
Locomotive tires	13.50 to 14.00
Pipes and flues	9.50 to 10.00
Tank iron and cut boilers	9.00 to 9.50
No. 1 cut busheling	11.00 to 11.50
No. 2 cut busheling	9.50 to 10.00
Cast and mixed borings	7.25 to 7.75
Machine shop turnings	8.75 to 9.25
Railroad malleable	12.00 to 12.50
Agricultural malleable	10.50 to 11.00
Stove plates	10.00 to 10.50
Angle splice bars (iron)	13.50 to 14.00
Angle splice bars (steel)	12.50 to 12.75

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ORE SINTERING PLANTS

To Be Installed by Steel Corporation —First Unit at Cleveland.

A license has been issued to the United States Steel Corporation and its subsidiary companies by the American Ore Reclamation Co., 71 Broadway, New York, for the installation of its Dwight & Lloyd sintering process for flue dust and fine ore. Plans are now in course of preparation for two machines for the initial installation, which will be made at the Central furnaces of the American Steel & Wire Co., at Cleveland. These machines will each have a capacity of about 125 tons daily. The results obtained by this installation will determine the extent by which the process will be adopted by the other subsidiary companies.

The American Ore Reclamation Co. has also granted a license for the installation of its process by the Toledo Furnace Co., Toledo, O. Two machines of the 125-ton type will be installed at this plant. In addition to these licenses, the company now has installations either in operation or under way at the plants of the E. & G. Brooke Iron Co., Birdsboro, Pa., the Eastern Steel Co., Pottstown, Pa., and at the Eliza furnaces of the Jones & Laughlin Steel Co. at Pittsburgh, Pa.

Eastern Manager Resigns

Edward B. Cook, general manager of the Warwick Iron & Steel Co., Pottstown, Pa., has resigned to accept a position with the blast furnace department of Pickands, Mather & Co., Cleveland. Mr. Cook will be stationed at Cleveland. The change will be effective in a few days, but Mr. Cook will continue to give some advisory attention to the Pottstown plant for several months. The present organization of the Warwick Iron & Steel Co. will be continued to operate the plant, and no changes are in contemplation by the management at this time.

Foundrymen See Moving Pictures of Industry

A crowd of several hundred foundrymen and others interested in the iron industry, witnessed the series of moving pictures describing the manufacture of iron from the ore to the steel rail mill, which were presented by Rogers, Brown & Co. under the auspices of the Philadelphia Foundrymen's Association at the Hotel Walton, Philadelphia, Wednesday evening, Nov. 6. H. B. B. Yergason, of Rogers, Brown & Co., presented the pictures which, as in all previous presentations before trade bodies, proved to be highly instructive and entertaining for those present. At the business meeting of the Philadelphia Foundrymen's Association on the same occasion, the nominating committee made a report and selected the present officers to serve during the coming year. These are as follows: President, Thomas Devlin, Thomas Devlin Mfg. Co., Philadelphia; vice president, E. E. Brown, E. E. Brown & Co., Philadelphia; treasurer, Josiah Thomson, J. Thomson & Co., Philadelphia, and secretary, Howard Evans, J. W. Paxson Co., Philadelphia. The executive committee remains unchanged.

Authorizes Pig Iron Rates

Washington, Nov. 12. — The Interstate Commerce Commission has authorized the railroads to make rates on pig iron and articles taking pig rates from southern furnaces to Salem, Ind., as follows: Birmingham, Ala., $3.60; Chattanooga, Tenn., $3.35; Sheffield, Ala., $3.10; Rockdale, $3.10; Big Stone Gap, Va., $3.10; Middlesboro and La-Follette, Tenn., $2.85; Carnegie, Tenn., and Bristol, Tenn.-Va., $3.35; Rome, Ga., $3.60; Dayton, Tenn., $3.15; Allen's Creek, Tenn., $3.35; Goodrich, Tenn., $3.10; South Pittsburgh, Tenn., $3.19, and Clarksville and Bear Spring, $2.60.

These rates are in harmony with the $3.25 scale to Cincinnati and other Ohio river crossings against which the Sloss-Sheffield and other southern furnaces have complained and on which a hearing is being held.

Testimonial Dinner

A testimonial reception and dinner will be given in honor of William H. Donner, president of the Cambria Steel Co., Daniel Coolidge, president of the Lorain Steel Co., and James A. Farrell, president of the United States Steel Corporation, Thursday evening, Dec. 5, at Johnstown, Pa. J. L. Replogle, vice president and general sales manager of the Cambria Steel Co., and several other Johnstown men, comprise the committee in charge of the program.

New Ore Mill Starts

Operations of the new No. 4 concentrating mill of Witherbee, Sherman & Co., at Mineville, N. Y., were inaugurated during the past week. Crude ore from the Barton Hill mines will be treated and the concentrates will be of low phosphorus Bessemer quality. About 500 tons of crude ore daily are being handled, but this can be greatly increased. The new plant is electrically operated and represents probably the most modern concentrating mill in the country.

NOTES OF WARNING

Against Advancing Prices and Yielding to Labor Demands.

One or two warning notes with regard to the continuance of the trade boom and especially the danger resulting from the greatly increased cost of production were uttered at a dinner held at Sheffield, Eng., Oct. 25, in connection with the Sheffield Society of Chartered Accountants. G. J. Hobson, the Lord Mayor, said that how long the present trade boom in Sheffield would last they did not know. The only warning note he had to give was that the cost of production was running up rapidly, "and as a rule," he said, "the end of a boom is near when the cost goes up rapidly." Increased cost meant increased selling prices, and that condition of things restricted demands, and as soon as those who placed orders began to feel that by waiting a little they might get articles more cheaply, he was afraid the rush of orders would become no more than they could comfortably deal with. "When that will come, I don't know," he added. "I hope it is for some time removed, but I am afraid that it is approaching somewhat at the present time."

Higher Prices on Plates and Shapes

Pittsburgh, Nov. 13. (By wire.)— Several important independent manufacturers have withdrawn the 1.50c quotation on steel plates and structural shapes and are now asking 1.55c and 1.60c for forward shipment. One of the mills has booked considerable tonnage at the advanced prices for shipment for first quarter. A leading interest and some of the independent mills have not withdrawn quotations, but are refusing to book anything but specific work. On material for prompt delivery, some makers are obtaining 1.80c and 1.90c.

Foundries Paying Higher Wages

The Chicago foundries are beginning to feel the effects of prosperity in the shape of pressure for higher wage. The union shops especially are having difficulty in keeping their men contented. Early in the year, plenty of melters were available at $3.50 to $4 per day, but at the present time the minimum wage is $3.75 and some union shops are paying $4.25 to their best men. Helpers' wages have also come up, the minimum now being $2 a day as against $1.75 earlier in the year. An attempt to establish the eight-hour day on the Chicago foundries would not be surprising.

A Large, Modern, Wisconsin Drop Forging Plant

Description of the Forging Department of the A. O. Smith Co., Milwaukee, Including the General Layout and Equipment

The remarkable growth of the steel castings industry in the central west has been accompanied by an equally noteworthy expansion in the drop forging business. The causes underlying this tremendous increase in output are the same in both cases and are to be found in the greatly increased production of agricultural implements, automobiles, motor trucks and similar lines of machinery in the middle west during the past few years. In some cases, the expansion in the drop forging business has been tremendous. An example of this is found in the history of the A. O. Smith Co., which is now operating a large drop forging department in connection with its plant at Milwaukee. Two years ago the forging department of this company had four steam hammers with an output of approximately 25,000 forgings a month; today the plant has 19 steam hammers and an output ranging from 100,000 to 160,000 forgings per month.

The A. O. Smith Co. operates a large plant devoted to the manufacture of motor trucks and special machinery. It makes all of its own drop forgings and, in addition, does a large volume of outside work. The forge department is equipped to turn out forgings ranging from 6 ounces to 350 pounds in weight, and includes in its equipment what is said to be one of the largest steam drop hammers in the country. The construction of the buildings now occupied by the drop forge department was commenced in the summer of 1910, but extensive additions have been made to the plant from time to time during the past two years, as the growth of business required. The designers of the plant showed considerable foresight in laying out a shop which can be readily extended, and this constitutes one of the chief features of the plant. The drop forging department now employs 90 men, of whom 40 are smiths and 25 are connected with the die-sinking department. The forges, heat-treating furnaces, etc., are designed to burn fuel oil, the consumption at present ranging from six to eight 10,000-gallon carloads per month.

Die-Sinking Department

The operation of a drop forging plant includes die-sinking and heat-treating in addition to the actual smithing operations. Die-sinking may be classed as a fine art and requires a high order of intelligence on the part of both the designer and the workman. It frequently happens that comparatively slight changes in the design of the dies for a given forging make a difference of as much as 40 per cent in the cost of production.

The die-sinking department of the A. O. Smith Co. occupies a room approximately 80 feet square partitioned off from the main machine shop. Special attention has been given to lighting and ventilation in order that the work will be produced under the best possible conditions. The equipment of this department includes the usual array of lathes, planers, milling machines, drills, grinders, etc. The die-sinking shop is provided with a mono-rail trolley, which is equipped with a triplex hoist used for handling heavy dies in the manner illustrated in Fig. 4. This is a view of a pair of dies for a four-throw gasoline engine crank. The crankshaft is 3 inches in diameter with a 10-inch flange on each end. One set of die blocks only is used, the breakdown and finishing dies being made on the same block. The die blocks are 35 inches long, 2?

FIG. 1—A SECTION OF THE DROP FORGING DEPARTMENT OF THE A. O. SMITH CO., MILWAUKEE, SHOWING A ROW OF HAMMERS

FIG. 2—AN 8-TON, CHAMBERSBURG STEAM DROP HAMMER AND TRIMMING PRESS

inches wide and 9 inches thick, and weigh approximately 5,000 pounds per pair. It is generally considered essential that die blocks be made of specially hard steel in order to resist wear. In making large dies, of the character illustrated in Fig. 4, the A. O. Smith Co. has found that a good grade of ordinary open hearth cast steel is very satisfactory. It has the advantage of being comparatively soft in its natural state, thus making it possible to machine it at low cost. The break-down dies for the crank, illustrated in Fig. 4, are cast in the die blocks, thus saving a great deal of expensive machining in finishing the pair. When in use the dies are fitted to an 8-ton steam hammer and the forging is made from a 3½-inch square bar.

The single throw crank shown at the extreme right, Fig. 5, is also made on the 8-ton steam hammer. In this case the center is forged between dies and the ends are drawn out afterward. The weight of this forging, finished, is 150 pounds. Fig. 5 also illustrates a number of difficult forgings, including two large automobile axles, which are shown at the left. These are specially difficult to make on account of the I-beam section, which has a tendency to stick in the dies. The largest of the two axles shown in Fig. 5 weighs 125 pounds and is 5 feet, 6 inches in length. In making this axle each end is forged separately. The six-throw crank shown alongside the single-throw crank is made in dies similar to those illustrated in Fig. 4 and is afterward twisted into the proper shape while hot.

Arrangement of Hammers

The general layout of the hammers of the A. O. Smith Co. drop forging department is shown in Fig. 3, while Fig. 1 illustrates a row of hammers and presses on the north side of the shop and Fig. 2 shows the large, 8-ton Chambersburg steam drop hammer, together with the heavy trimming press which is used in connection with it. As indicated in Fig. 3, the equipment of the hammer department includes 19 steam and board drop hammers, together with a full

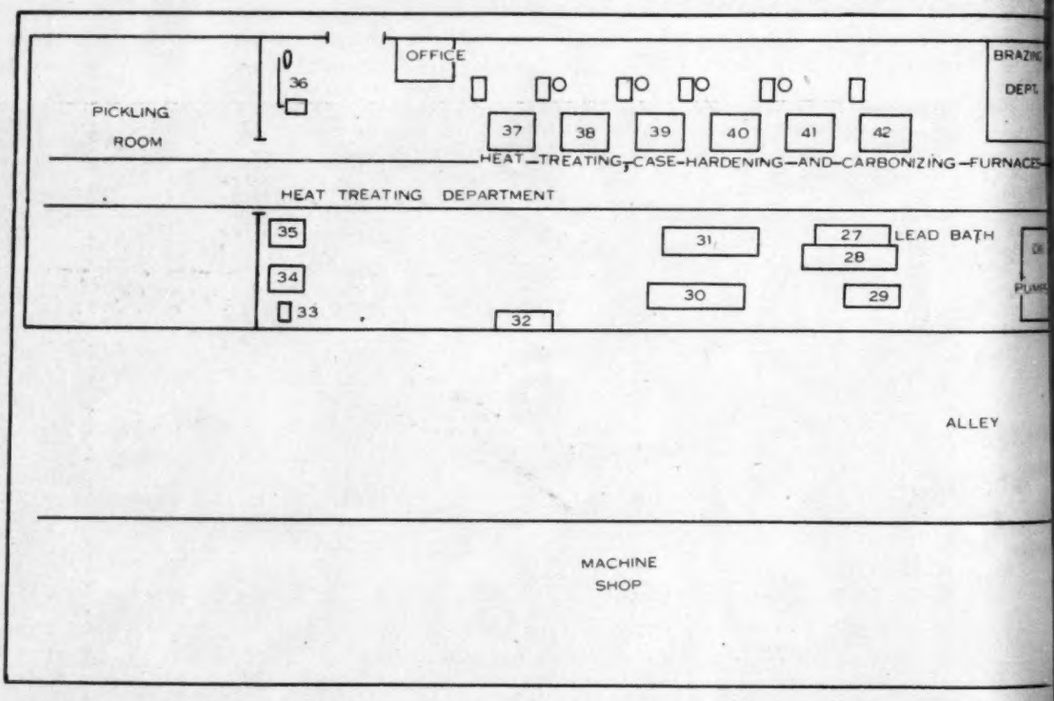
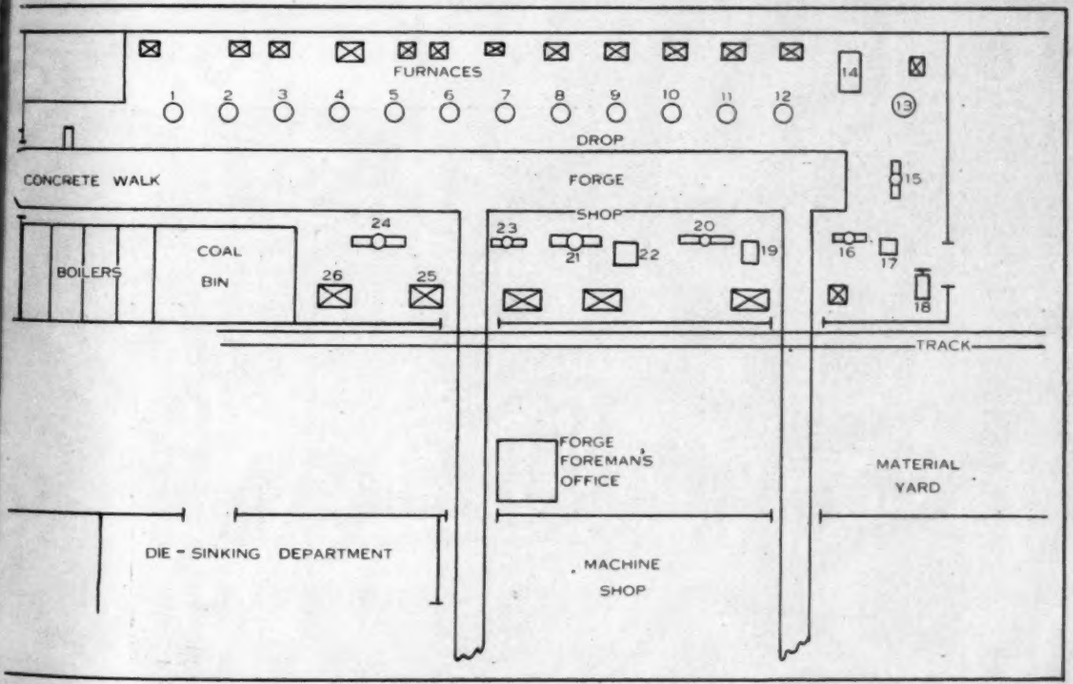


FIG. 3—GENERAL LAYOUT OF DROP FORG

Key to ground plan: *1*—1,200-pound Bliss drop hammer; *2*—1,000-pound Bliss board drop hammer; *3*—1,200-pou hammer; *6*—2,500-pound Bement-Niles steam drop hammer; *7*—2,000-pound Bement-Niles steam drop hammer; *8*—1,5 drop hammer; *11*—2,500-pound Lane steam drop hammer; *12*—1,500-pound Bell steam drop hammer; *13*—1,500-pound B —Toledo trimming press; *18*—raw stock shears; *19*—Toledo trimming press; *20*—3,500-pound Erie steam drop hammer; steam drop hammer; *24*—4,800-pound Chambersburg steam drop hammer; *25*—Bliss trimming press for 4,800-pound hamm feet by 36 inches by 36 inches; *29*—annealing furnace, 16 feet by 78 inches by 54 inches; *30*—water tank, 24-foot; *31*— furnace; *36*—motor and blower; *37*—six-foot tool hardening furnace; *38*—six-foot heat-treating furnace; *39*—small h izing furnace.

complement of trimming presses and oil-fired furnaces. For handling heavy forgings the machines are provided with I-beam trolleys as indicated in Fig. 2. A concrete walk extends down the middle of the shop between the two rows of hammers. Wheelbarrows and small trucks are used for carrying away the forgings in place of a crane or industrial railway. Between the 16,000-pound Chambersburg steam drop hammer and the 1,000-pound board drops located in the northwest corner of the shop, are a variety of steam and board drop hammers of various capacities arranged to handle a wide range of work. The hammers and presses are arranged alternately on either side of a wide aisle extending through the middle of the plant, while the furnaces are located directly back of the hammers. By this arrangement of hammers and furnaces, the hot material is forged and treated in a comparatively small space and in such a short time there is no perceptible cooling. The board drops and trimming presses are belt-driven from countershafting which is in turn connected to a 100-horsepower electric motor. The hammers are furnished with steam by four 150-horsepower, 72-inch x 16-foot horizontal return tubular boilers furnished by the Milwaukee Boiler Co. The boilers carry 150 pounds steam pressure. Particular attention is paid

FIG. 4—DIES FOR A FOUR-THROW CRANK



AND HEAT-TREATING DEPARTMENTS

Bliss board drop hammer; *4*—1,500-pound Chambersburg steam drop hammer; *5*—2,000-pound Chambersburg steam drop pound Chambersburg steam drop hammer; *9*—2,000-pound Bement-Niles steam drop hammer; *10*—2,500-pound Erie steam steam hammer; *14*—No. 5 heading machine; *15*—1,500-pound Bell steam hammer; *16*—3,500-pound Erie steam hammer; *17* —16,000-pound Chambersburg steam drop hammer; *22*—trimming press for 16,000-pound hammer; *23*—2,500-pound Bement *26*—heating furnace for 4,800-pound hammer; *27*—lead bath, 16 feet by 16 inches by 14 inches; *28*—bar treating furnace, 24 tank, 24-foot; *32*—Hoskins recording pyrometer; *33*—oil tempering furnace; *34*—heat-treating furnace; *35*—cone hardening treating furnace; *40*—small carbonizing and case-hardening furnace; *41*—small case hardening furnace; *42*—six-foot carbon-

to the temperature at which the forgings are made. The colder a forging is finished, the closer to the exact size required it can be made, because there is less shrinkage to be taken into account; but it will also be harder, less ductile and stronger. The raw stock for the drop forging department is piled in the yard east of the building. The material enters the shop at the southeast corner and passes through shears in which it is cut to size. These shears will take 4-inch square hot billets. Alongside the shears is a blackboard containing a number of ruled columns for recording daily the stock delivered to each hammer. A somewhat similarly arranged blackboard is also hung in the foreman's office, on which is kept a record of the work at which each

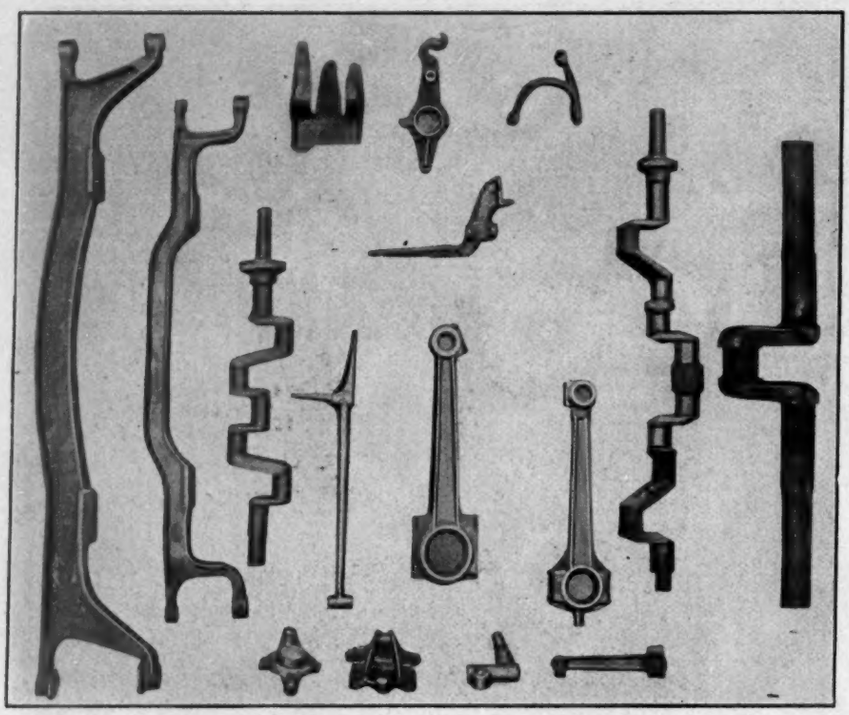


FIG. 5—SOME DIFFICULT DROP FORGINGS

smith is engaged. The heat-treating department is located west of the forging room and its general arrangement is indicated in Fig. 3. A view looking east down the north aisle of the heat-treating shop is shown in Fig. 6. This illustration indicates the general arrangement of the heat-treating and hardening furnaces together with the quenching baths and the mono-rail trolleys used for handling die blocks and other heavy work. In addition to the I-beam trolleys, trucks are used for handling the smaller forgings and the light work is placed in wire baskets for immersion in the quenching baths.

About 20 men are employed in the heat-treating department. The equipment includes seven heat-treating, carbonizing and case-hardening oil-fired furnaces ranging in size from 25 x 32 inches to 72 inches square. A special cone-hardening furnace is also installed, together with an annealing furnace 16 feet long by 6 feet, 6 inches wide and 4 feet, 6 inches high inside; a bar-treating furnace, 24 feet long, 3 feet wide and 36 inches high inside and a lead bath, Fig. 7. The latter is 16 feet long, 16 inches deep and 14 inches wide. Two 24-foot quenching tanks containing oil and water respectively, are situated near the bar-treating furnace. The various small furnaces are each equipped with a set of oil and water tanks as indicated in Fig. 6.

An accurate record of the temperature of each furnace is obtained by a Hoskins recording pyrometer. At the east end of the shop is the brazing department, containing the usual array of equipment, including four furnaces. The air blast for the heat-treating furnaces is furnished by a 40-horsepower, 220-volt motor belted to a positive pressure blower.

All the forgings from the hammer room are sent to the heat-treating department where they are either annealed, carbonized, case-hardened, heat-treated or tempered. The dies, tools, punches, etc., used throughout the plant are also hardened and tempered in the heat-treating department.

The distinction between case-hardening and carbonizing is as follows: Work which is case-hardened is first treated in the furnace at the proper temperature and then is withdrawn quickly, permitting it to cool rapidly. Forgings which are carbonized are packed in boxes with the carbonizing material and are then heated at the proper temperature in the furnace from 3 to 48 hours, after which they are allowed to cool very slowly. After carbonizing the material may be tempered like tool steel. Pieces which are case hardened are apt to warp or change their size when cooled; the carbonizing process is free from these difficulties. A similar distinction might be drawn between tempering and annealing. In the former case the material is heated and suddenly quenched, while in the latter it is allowed to cool slowly and become soft and ductile. The four operations of tempering, annealing, hardening and forging are each executed at a definite temperature, the tempering heat being the lowest and forging temperature the highest in the series. At the A. O. Smith Co.'s plant the annealing temperatures are controlled by a pyrometer; this is much more satisfactory than the old rule-of-thumb method.

The forgings, after being heat-treat-

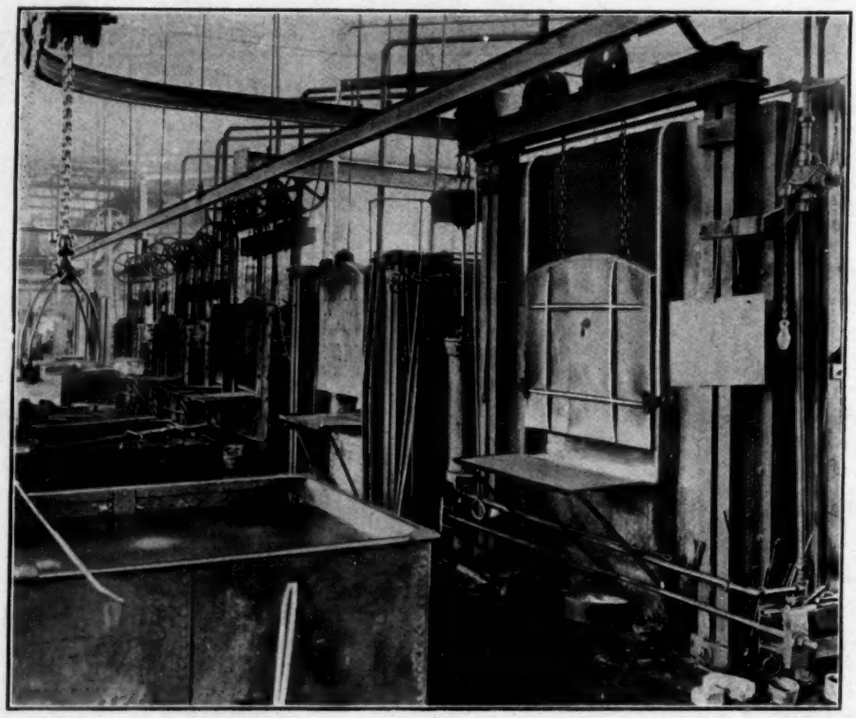


FIG. 6—HEAT-TREATING FURNACES WITH OIL AND WATER QUENCHING BATHS

ed, are pickled in dilute sulphuric acid to remove the scale. For handling heavy forgings, one of the pickling vats is served by a small crane. After annealing and pickling, the forgings are delivered to the cold trimming shop where all the excess fins, burrs, etc., which remain after the preceding operations, are cut off in presses or lathes, or ground off by emery wheels. In some cases also the smaller forgings are tumbled until they are polished. The treatment in the cold trimming shop is the last in the series of operations through which the forgings must pass in the process of manufacture.

Statistics of Fuel Oil Consumption

Since the beginning of the oil industry in the United States over two and a half billion barrels have been produced, and the total value of the oil, reckoned in the crudest condition at the mouth of the well, is over two billion dollars. More than half of this oil has come from New York, Pennsylvania, West Virginia and Ohio, and all has been produced in two years over half a century. In the first half of this period nearly the entire product came from the eastern fields, but lately the declining production of the eastern states has been more than compensated by the enormous output in the west, so that of the total product of the United States 972,429,805 barrels have been produced west of the Mississippi river, and at this time the mid-continent and California fields are the controlling influences in the oil production of this country.

The annual report of the United States geological survey on the production of petroleum shows that for 1911 California not only led in quantity of product (over 80,000,000 barrels) but produced almost half as much again as Oklahoma, the state second in rank. The mid-continent field omitted, California produced as much oil as the rest of the United States.

The rank of the states is easily remembered when one recognizes California, Oklahoma, and Illinois as forming a class by themselves, the lowest (Illinois) producing over 30,000,000 barrels and the three furnishing three-fourths of the entire output. The second group includes Louisiana, West Virginia, Texas, Ohio, and Pennsylvania.

The most important feature developed by the oil industry of 1911 has been the realization of a supply of fuel oil large enough to be reckoned on as a national asset in the production of power. During 1910 arguments became convincing that fuel oil was sufficiently plentiful on the Pacific coast to justify great trade and manufacturing expansion in California, and indeed the adoption of oil as fuel on the northern transcontinental railroads for significant portions of their lines and the introduction of oil as fuel as far north as Alaska, without bringing the consumption up to the level of present production, has given assurance of permanency of the supply sufficient for the industrial needs of the whole Pacific slope.

The solution of the corresponding problem on the Atlantic coast received much encouragement in 1911 by the great development of oil supplies in Mexico. The quantity of oil which the Mexican fields are now ready to furnish is variously estimated at 6,000,000 to 12,000,000 barrels a month. The total output in 1911 was perhaps a tenth as much, the production being limited not by supply or demand but by transportation facilities. The needed tank steamers are being furnished as rapidly as they can be built, and meantime the popularity which fuel oil has obtained has already led to a doubling of its market price.

Railroad consumption of fuel oil is especially popular because it gives added comforts in travel owing to the freedom from coal cinders, because it avoids the danger of forest fires, and particularly because it makes a saving in labor. In fact, until coal can be replaced by oil the weight of trains on mountain divisions is limited by the endurance of the fireman.

It is estimated that nearly 50,000,000 barrels of the California oil in 1911 were used for fuel. The Texas and Louisiana fuel oil used is estimated at 9,000,000 barrels, much of which was in the form of residues after light distillates were taken off. In the mid-continent field also crude oil as fuel is fast giving place to these topped oils. Of this material about 2,000,000 barrels were consumed. Little oil from the eastern fields finds use as fuel, because the heavy residuum is valuable for manufacture into lubricants, paraffine wax, etc. In all nearly 62,000,000 barrels were probably consumed as fuel oil in 1911 in the United States; a fair estimate of the consumption for the preceding year is 61,000,000 barrels, the increase showing a growing appreciation of oil as fuel.

FIG. 7—LEAD BATH IN THE HEAT-TREATING DEPARTMENT

The Farrel Foundry & Machine Co., Ansonia, Conn., manufacturer of chilled rolls and heavy machinery, recently has completed a three-story office building, containing seven rooms on the main floor and nine offices and a large vault for files on the second floor. A direct and indirect heating system has been installed, which has a capacity of 6,500 cubic feet of fresh air per minute.

An Economical Oil House

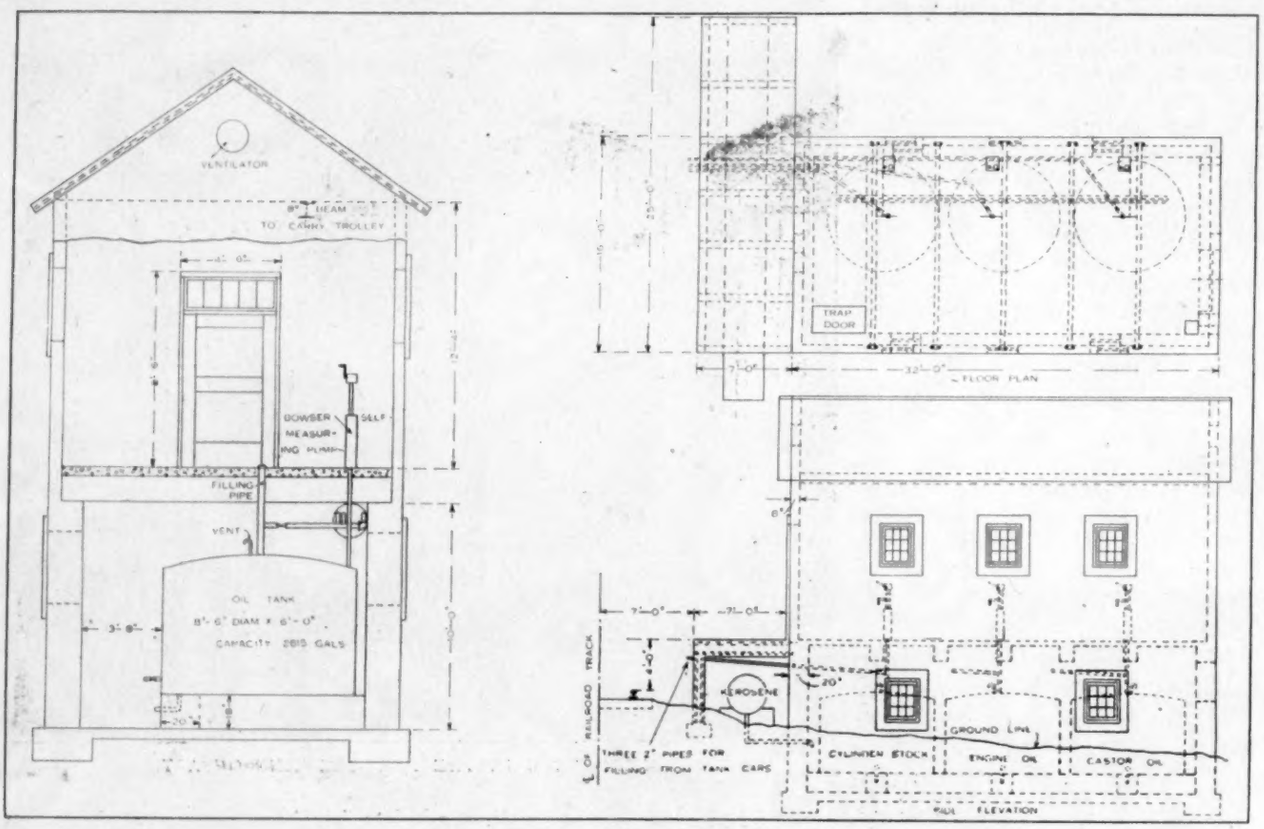
In going over the factory expenses of a large concern in the middle west at the end of the year it was found that the oil bill had jumped from $3,191 during 1910, to $5,236 in 1911, an increase of over 60 per cent. Investigation showed that the increase was due almost entirely to wasteful methods of handling oil, induced by the fact that no check was kept on the consumption of the various departments and individuals. Anyone requiring a supply of oil went to the storage tanks and drew as much as desired. It was decided to remedy matters by building an oil house and placing a man in charge of all the lubricants used in the plant.

The accompanying illustration shows the design and arrangement of the oil house. The building is 32 feet long and 16 feet wide, the walls being brick and the roof consisting of reinforced concrete slabs laid on channel steel purlins. In front of the oil house alongside the railroad spur a platform 25 feet long and 7 feet wide was built; the floor of the platform is 4 feet above the track, about the height of a box car door. There are three tanks, each 8 feet 6 inches in diameter and 6 feet high, in the basement. Each tank has a capacity of 2,615 gallons. The three tanks are used for tthe storage of cylinder oil, engine oil and castor oil, respectively. Self-measuring pumps are used to draw off the oil. A horizontal tank 3 feet in diameter and 28 feet long is placed under the platform for the storage of kerosene.

The detailed cost of building this house is as follows:

Building:—		
Surface labor	$504.94	
Carpenter labor	131.24	
Machinists and blacksmith	184.30	
Teaming	60.28	
		$ 880.76
Supplies:—		
Cement	$298.77	
Sundries	277.70	
		$ 576.47
		$1,457.23
Equipment:—		
Tanks (not including kerosene tank)	$556.13	
Pumps	150.00	
		$ 706.13
Total cost		$2,163.36

As suggested, the oil house is in charge of a man who receives the lubricants and issues them to the various engine rooms and departments, keeping a record of the amounts issued in a blank book provided for the purpose. The various departments are furnished with cans of a size sufficient to hold a few days' supply and the names of the departments to which the cans belong are stamped on strips of sheet brass soldered to the cans. No oil is issued except on a requisition signed by the chief engineer, master mechanic or the department foreman. Leaky cans or cans with broken spouts are gathered up periodically by the repair man.



VERTICAL SECTION, PLAN AND ELEVATION OF OIL HOUSE

British Electric Steel Works

The Stobie Steel Co., Sheffield, Eng., according to reports, has decided to erect a steel works to manufacture tool steels, alloy steels, etc., in which all melting will be done by electricity. It is said that the installation at first will include a 15-ton, three-phase, steel melting furnace; 5-ton, two-phase furnace for special steels and a 3-cwt. alloy melting furnace. These furnaces have been designed and built by Victor Stobie. A 2-ton electric steel melting furnace will soon be built for another Sheffield works and a 15-ton furnace for a plant in another part of Great Britain.

Revealing Defects in Sheets by the Microscope[1]

How Metallography Aids the Manufacturer of Steel Sheets in Detecting Off-Grade Raw Material and Points Out Imperfections in the Finished Product

By C Arthur White

Steel for the manufacture of sheets should be of the highest grade of soft steel, which, I fear, is not fully appreciated nor acquiesced in by the average maker of steel for this purpose. A better understanding and fuller appreciation of this fact will no doubt result from a careful consideration of only a few important features.

Commercial steel sheets vary in thickness from 0.0061 inch, or No. 38 gage, to and including 0.14 inch, or No. 10 gage, and the surface area varies from 6 to 50 square feet. These sheets are used for various purposes, and ignoring the quantity employed for roofing and siding and various covering purposes, the product enters into many diversified channels, and is subjected to extremely severe physical tests. Sheets are drawn, stamped, pressed and distorted into every conceivable form and shape and it is surprising that there are not more failures than are reported today. A large tonnage also enters into the manufacture of highly surfaced and polished products, wherein almost the slightest surface defect or irregularity will condemn the product. This class includes stock for automobile manufacture, metallic furniture and various other kindred requirements. In view, therefore, of the diversified uses and severe physical strains and stresses to which sheets, as a rule, are subjected on the one hand, and the almost perfect surface condition demanded on the other, the statement that steel for the manufacture of sheets should be of the highest possible grade, is fully warranted.

Physical Defects

Inherent physical defects are not protected to the same extent as would be the case in heavier sections, as practically all are brought to the surface. In addition, every square inch of the sheet is subject to inspection for physical surface defects or to mechanical working and distortion.

Failures in this class of product, when studied from a chemical standpoint, have not been satisfactorily accounted for, but for some time efforts have been made to ascertain the causes of failures by the use of the microscope. The results have been gratifying and foreshadow considerable advancement in practice and a great improvement in product.

By the study of steel sheets microscopically, inherent defects are readily discernible, and the distribution of the various metalloids are made plain and clear. In addition, the physical structure and relative proportions of constituents present, grain size, and the influence of various heat treatments are clearly defined. It is admitted that metallography has its limitations, and can never be made to replace chemical analysis. It is, however, the only means at hand whereby the internal irregularities, such as ruptures, physical arrangement of crystals, etc., can be determined. Chemical analysis does not disclose these, nor does it disclose cleavage lines and physical imperfections readily discernible by the microscope; and while chemical analysis is of prime importance, we believe we approach nearer to the actual conditions by combining with chemistry the science of metallography.

High Grade Steel Necessary

The chief aim of the steelmaker should be to produce clean, solid ingots, as free from segregation as is possible under the best and most approved methods. Oxidized steel cannot be used to advantage by the sheet maker as it is physically weak, carries a maximum amount of surface defects in its finished form, and is peculiarly susceptible to injury when exposed to certain finishing treatments. One cause frequently contributing to the production of oxidized steel is its manufacture with a slag covering of too thin consistency, or of a depth too shallow to properly protect the metal, in which event the temperature throughout the process, particularly at the end of the operation, is too high, causing the slag to carry a high oxygen content, which contributes to the oxidation of the metal in contact with it. Another prolific cause of trouble is the improper feeding of ore which is added from time to time for reducing purposes, particularly with the last additions, which are sometimes made in too great quantities, or after which sufficient time has not been allowed to thoroughly work out all the impregnated gases and oxides. Such heats will not produce sheets of good quality and are in evidence more as the lighter gages are approached. The best made low carbon steels, under proper furnace practice and manipulation, will undoubtedly occlude certain gases which form blow-holes, and the casting temperature is unquestionably an important factor governing their position, size, and extent throughout the ingot. Steel cast at a very high temperature usually shows these blow-holes near the surface, and these are protected against oxidation only by a very thin skin of metal. Steel cast at too low a temperature solidifies too quickly, with the probability of occluding considerable quantities of gas due to the rapid solidification. These gases are sealed in the steel and their escape is impossible. There is in this, as in all operations, however, a happy medium, and when the steel is properly made and cast at the proper temperature, it is possible, by the segregation of the impurities and gases, to localize these cavities in a pipe near the top. If this is discarded by proper cropping, a highly satisfactory material remains.

Honeycombed Steel

Low carbon steels, highly oxidized as a result of improper furnace treatment, are certain to carry blowholes and a honeycombed structure near the surface, which are protected only by a very thin skin of metal. The ideal aimed at is the production of ingots having as heavy skin as possible to protect the steel against further oxidation. The use of various elements, such as aluminum, silicon, etc., to correct evils of this character, probably can be seriously questioned. The end to be sought by the steelmakers, and which is probably too often neglected, is to produce well-made steel, properly treated throughout the various operations, rather than to depend on a deoxidizer to overcome or correct bad

[1]Presented at the Pittsburgh meeting of the American Iron and Steel Institute.

results which would never have been in evidence under proper practice. It is better for all concerned to have the steel properly made, rather than to carry on this operation in a more or less careless manner, feeling secure in the belief that some element will be added at the finish of the operation to overcome a condition which should never have existed. It cannot be seriously questioned, that steel produced without the necessity for additions of aluminum, silicon or other deoxidizers, is vastly superior to steel obtained by their use, having in mind that furnace operators feel that the addition of a deoxidizer at the end of the operation will correct all furnace irregularities. Such a mistaken impression undoubtedly tends to many irregularities in the finished product, and probably gives rise to the belief that we are justified in hurrying or forcing the operation of furnaces in the interest of tonnage. This, I believe to be absolutely wrong, and one of the fatal mistakes daily made in some of the large steel producing plants. Nor do we feel that quality can be maintained and the production forced beyond a reasonable point.

Reheating the Steel

Importance should be attached to the complete solidification of the metal in the molds prior to stripping and its delivery to the soaking pits; this, in a measure, prevents hot cracks in stripping, and overcomes shrinkage cracks to a large extent if performed at the proper time. Care should be taken to soak the ingots to the desired temperature, and in a reducing atmosphere. The practice of using soaking pits as heating furnaces under oxidizing conditions should be avoided, since in oxidizing atmosphere the skin of the ingot will be destroyed, exposing the honeycombed cells, which will, in future operations, be further oxidized, and in contact with the rolls will absorb dirt and oxide therefrom to the future detriment of the product. Ingots which have been washed or wasted to this extent will never produce a satisfactory product in sheet form, and while the cracks and rough, scabby surface may, in a measure, be healed over in the future bar mill operations, these will all again be disclosed as the material is reduced to the thinness of sheets, and will be in evidence as laminations and scabby surface conditions not susceptible to a satisfactory finish in sheet form. Aside from general surface appearance, the material is far from being physically up to the proper standard, interfering with drawing and stamping operations, as well as future coating operations, if such are desired.

Sheet mill operations, as carried on at various points, may be susceptible to some criticism, principally due to the lack of cleanliness in the removal of such loose scale as is produced, more or less, under the best practice; this results, at times, in surface defects which may be unfairly attributed to the steel itself. The various operations in this line of work are of course important, proper heating to prevent excess scaling being paramount. The probability of overheating is very remote, and almost negligible, due to the maintenance of reducing atmosphere and the short duration of the heating period.

In the manufacture of sheets two methods of annealing are followed. These are known as box or tight annealing, and open annealing. In the former the sheets are protected from direct contact with the flame by being enclosed in air-tight steel lids resting on flat bottoms, and carefully sealed with sand. In open annealing, which is carried on almost entirely on heavy gage sheets, these are placed in the furnace and are subjected to direct and intimate contact with the flame itself. This method is pursued largely in the manufacture of heavy gage sheets to overcome the danger of crystallization which takes place quite frequently in heavy gages when box-annealed. The proper temperatures for this part of the operation are determined by gage, size and volume of the sheets entering into the operation, as well as the peculiar needs or requirements of the various customers. This equipment should be kept in good condition to prevent air entering or coming in contact with the material during the heating and cooling periods which causes oxidation on the edges of the sheets, to their future detriment.

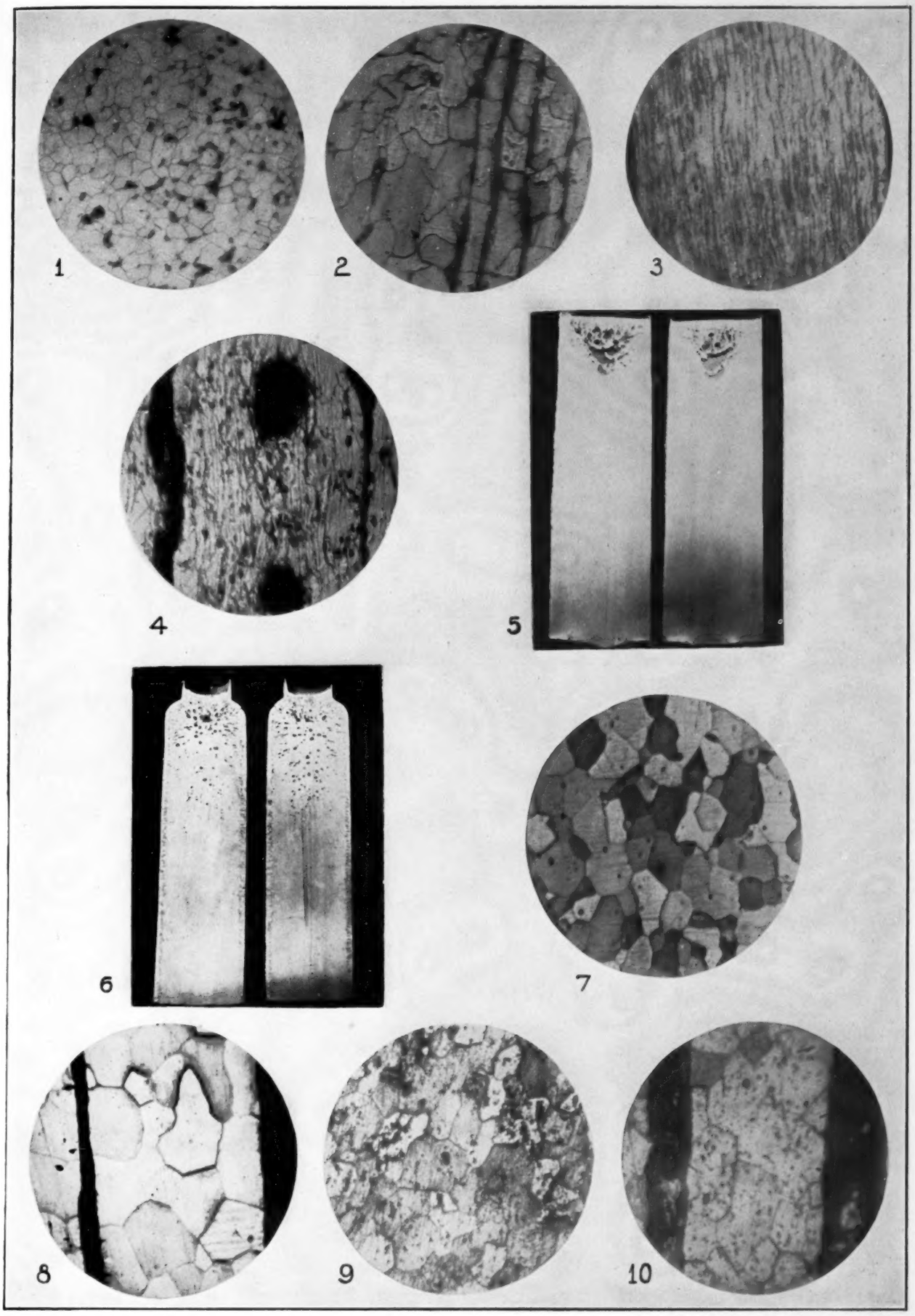
Pickling

Before considering the specimens which have been prepared, I will refer to the operation which is general for all sheets to be coated, as well as for such sheets as require highly polished and finished surfaces. This is the process of pickling, which is carried on in a weak solution of sulphuric acid; and in this operation, probably more than in any other, are the inherent weaknesses of the steel revealed. All laminations and physical defects are stripped of their covering of oxide, and what was apparently a minute defect becomes glaring after this operation. It is here also that oxidized steel is readily discernible. Sheets produced from a thoroughly good quality of steel are but slightly soluble in acid in this operation, whereas those highly oxidized are shown to be distinctly soluble. The reaction between the acid and sheets unquestionably gnerates a large volume of hydrogen gas which the sheet absorbs and in turn reduces the oxides present, forming spongy iron and water vapor, developing blisters. The sheet is left in a correspondingly weak, porous condition, due primarily to these inherent defects. Many internal defects which would never become apparent in the black sheet are revealed by the pickling operation. It is recognized by sheet makers generally that all steel is predisposed to blister and will dissolve on exposure to sulphuric acid, so that the constant aim in this operation is, and should be, a minimum exposure to the action of the acid consistent with the proper cleansing of the surface.

Defects Revealed by the Microscope

Microphotographs of some exceedingly interesting specimens, in which defective material is discernible by the use of the microscope, are shown in the accompanying illustrations. A specimen of steel, showing a clean and homogeneous structure, is illustrated in Fig. 1. This is an edge view of a sheet bar, ½ inch thick, rolled from a well-made and properly cast ingot. Fig. 2 is a microphotograph showing seams and oxides in steel. This is an edge view of a sheet bar, ½ inch thick, which was rolled from an ingot of oxidized steel. An edge view of a No. 29 gage sheet, rolled from a heat of steel that had good surface and physical qualities, is illustrated in Fig. 3. This microphotograph shows the unannealed product and the rolling strains are readily discernible. Fig. 4 shows a No. 29 gage sheet, rolled from oxidized steel. This specimen is unannealed and the rolling strains and imbedded oxides are outlined clearly. The two halves of a 16 x 18-inch, low carbon steel ingot, split lengthwise, showing steel properly made and cast, are illustrated in Fig. 5. Ingots, with steel of this quality, are excellent for subsequent finishing into sheets. Fig. 6 is a 16 x 18-inch, low carbon steel ingot, split lengthwise, cast from oxidized steel. This material will result in the rolling of sheets of poor quality.

Fig. 7 is a microphotograph showing the surface of a No. 30 gage sheet used for electrical purposes. This material has high permeability and a low iron loss. Fig. 8 is an edge view



MICROPHOTOGRAPHS OF STEEL FOR SHEETS, SHOWING HIGH GRADE AND DEFECTIVE MATERIAL

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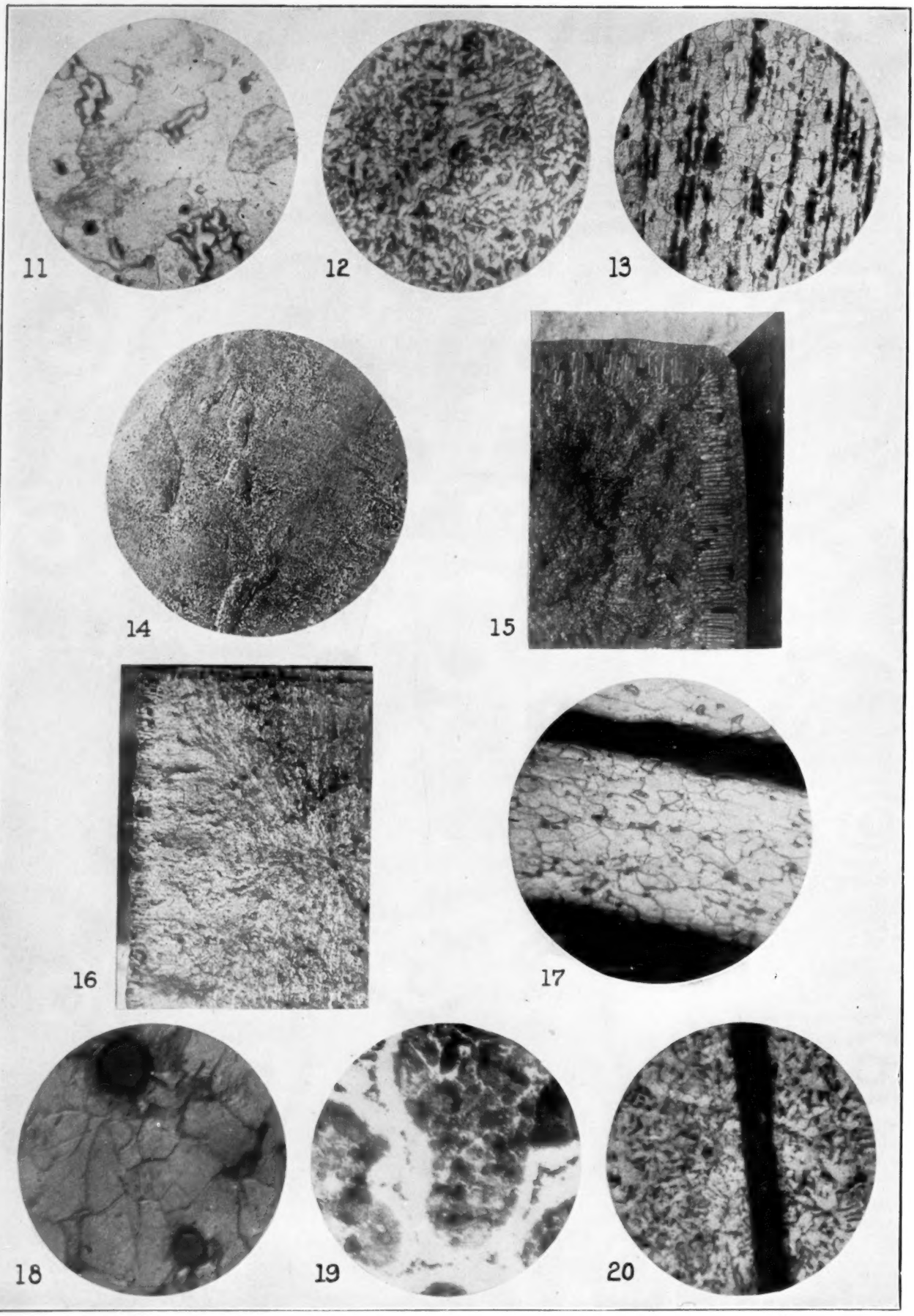

MICROPHOTOGRAPHS OF STEEL FOR SHEETS, SHOWING HIGH GRADE AND DEFECTIVE MATERIAL

of the same sheet. Fig. 9 is the surface view of a No. 30 gage electrical sheet of low permeability and high iron loss due to occluded oxides, while Fig. 10 is an edge view of the same sheet. In Fig. 11 a microphotograph is shown of No. 16 gage, box-annealed sheet, which shows a large grain and the carbon existing as cementite between the junction lines of the grains. Fig. 12 shows a No. 16 gage, open-annealed sheet. The steel has a small grain and the carbon exists as pearlite and is uniformly distributed throughout the structure. Fig. 13 is a surface view of a No. 28 gage sheet after annealing, which shows occluded oxides and is very soluble in the pickling bath. Fig. 14 is a surface view of the sheet after pickling, showing blisters.

Defective Steel

A transverse section of an ingot, showing the honeycombed portion and the skin that protects it against oxidation, is illustrated in Fig. 15. If properly heated and rolled, such an ingot can be finished into sheets having a good surface and excellent physical properties. A transverse section of an ingot, showing the honeycombed section with a very thin skin of metal on the surface, is illustrated in Fig. 16. This type of ingot invariably produces a bad surface and is week physically when finished into sheets. An edge view of a No. 26 gage sheet, box-annealed, showing a uniform structure free from oxides and a very ductile material, is illustrated in Fig. 17. Fig. 18 shows slag imbedded in the surface of a box-annealed sheet. A surface view of a very brittle grade of steel, showing portions highly carburized, is illustrated in Fig. 19. The white sections are pure iron with manganese sulphide inclusions. Fig. 20 is an edge view of a No. 16 gage open-annealed sheet.

The Cuyuna District, South Range, Iron Ores[1]

Tremendous Deposits of High Iron-Bearing Ores, of Excellent Physical Structure Have Been Located on This Range

By W A Barrows Jr

In this paper will be discussed what is known locally as the South range, a part of the Cuyuna iron ore district, in Crow Wing county, Minnesota, which has, until the past year, been almost wholly neglected by the ore consuming interests operating in the Lake Superior region. Explorations by means of churn and diamond drilling have been carried on in this district continuously for the past eight years. There is indicated by this work 110,000,000 tons of iron ore, the average daily analysis of which is slightly below 50 per cent iron dried at 212 degrees Fahr., and includes no ore analyzing below 40 per cent iron. Included in this estimate are 50,000,000 tons having an average analysis of 54.60 per cent iron, containing no ore, sampled and analyzed, showing less than 50 per cent iron.

It should be borne in mind that properties on the South range only are included in these estimates. The North range shows a tonnage greater than the South range, contains several producing mines and is consequently better known. There is apparently no structural difference between ores from the North and South ranges.

Active mining operations on the South range are being conducted at the Adams mine, 3 miles southwest of Deerwood, and at the Barrows mine, 3½ miles southwest of Brainerd. The Adams mine operation is conducted by Cuyler Adams, the pioneer of the Cuyuna district, and associates, and the Barrows mine by M. A. Hanna & Co., Cleveland. Both of these properties are well-equipped, the Adams having a concrete shaft. The main drift at the Barrows mine is in the ore body and some little ore has been hoisted. Both properties will enter the shipping list in 1913.

Iron Formation Continuous for 16 Miles

The Adams and Barrows mines are 16 miles apart, and for this entire distance a continuous iron formation has been shown by drilling. On the surface, two parallel lines or bands of magnetic attraction, nowhere more than 1½ miles apart, can be traced over this 16-mile distance. This attraction continues in a southwesterly direction, and commercial iron ore has been shown by drills 25 miles southwest of the Barrows mine.

A few years ago an exploring shaft was sunk by Pickands, Mather & Co., Cleveland, on the South range, midway between the Adams and Barrows mines, where drilling had shown an ore body, and drifts and crosscuts were run into the ore. This work confirmed the belief, gained from the study of drill cores, that the Cuyuna ores were of excellent physical structure, the ore body consisting of interbedded seams of hard and soft ore and entirely free from the finer, sandy material so common in Mesabi ores. This fine, sandy material is the source of the flue dust in furnaces running on high percentages of Mesabi ores.

In general appearance and physical structure Cuyuna ores closely resemble ores from the Marquette or Menominee ranges. The iron-carrying ingredients of the South range ores consist of a mixture of hematite, limonite and iron carbonate. Tests of this ore show an iron content of 49.50 per cent, natural condition. This compares favorably with the average analyses of the non-Bessemer ores shipped from the Mesabi range during the past three years. It is probably not generally known that the average natural iron content of all non-Bessemer ore shipped from the Mesabi range in 1911 was 49.55 per cent; in 1910, 49.65 per cent; in 1909, 49.94 per cent, and in 1902, 53.55 per cent. These figures show that the general average of all ore now classed as merchantable on the South range is almost identical with the non-Bessemer Mesabi average for 1911, and that the average natural iron content of Mesabi non-Bessemer ores for seasons' shipment has dropped 4 per cent in 10 years.

The main advantage claimed for Cuyuna ores over ores from the Mesabi range is that of better physical structure, their use insuring freedom from flue dust troubles in smelting. A modern blast furnace when driven to its capacity on an all-Mesabi ore mixture will probably

[1]Presented at the Cleveland meeting of the American Institute of Mining Engineers.

entrain with the escaping gases not less than 5 per cent of the ore charged, even when operating smoothly with ore of average Mesabi range structure. During slips or periods of bad working, or when the finer structure Mesabi ores are used, the dust losses may greatly exceed 5 per cent. After considering carefully the difference in structure between Mesabi and Cuyuna ores, we conclude that ores from the Cuyuna range will successfully resist the entraining effect of the escaping gases in the blast furnace; moreover, when worked with Mesabi ores, they will greatly assist in reducing blast pressure and help to retain in the furnace that part of the finer Mesabi ore, otherwise likely to be blown over. It is difficult to show, in concrete figures, just how much loss is occasioned directly by waste of a part of the metallic contents of the charge as flue dust, and indirectly by the more rapid deterioration of furnace and stove linings, together with the added cost for repairs to gas and blast mains and castings. Possibly too much attention has been paid to the analysis of ore charged into the furnace, and too little attention paid to the actual furnace yield.

Suitable for Foundry, Gray Forge and Basic Pig Iron

The South range ores are well adapted chemically to the manufacture of foundry, gray forge and basic pig iron. The impurities common to all iron ores—silica, alumina, phosphorus and manganese—are reasonably uniform and not excessive.

Furnacemen generally will agree that iron ores containing limonite and iron carbonate, as these ores do, will absorb carbon readily in the blast furnace, due to the expulsion of water and carbonic acid in the heating and reducing zones, thereby opening up additional channels for the reducing gases and effecting reduction throughout the charge. This feature should promote fuel economy and faster driving of the blast furnace.

Aside from a slightly higher silica content than is really necessary, and a consequently larger slag volume, there is really no objectionable feature to these ores. The problems of the future in the metallurgy of iron certainly include the use of leaner iron ores. Is it not better to gradually widen the supply by including now in the furnace mixture such ores as are herein described, than to defer their use until necessity compels, as it surely must, a mixture of all low grade ore?

The Technical Training of Steel Salesmen

An Interesting Discussion of J. M. Camp's Paper on This Subject Presented at the Pittsburgh Meeting of the American Iron and Steel Institute

By E P Thomas

A few salesmen are born, most of them are made and some attention must be devoted to the making. Setting aside the possibility of genius, it is certain that it requires more than casual bonhomie, fluency of expression and elementary study of goods to make the most successful salesman. Mr. Camp has ably described a system instituted by the Carnegie Steel Co. to give salesmen as thorough a course in the various steps in the manufacture of steel as is possible in the necessarily limited time which the course is designed to cover. Valuable as such a course is to a man pursuing its study seriously, it cannot supply that more effective training only to be acquired by actual work in the mills; work undertaken either as a means of livelihood or for the experience and training it affords. As supplementary to Mr. Camp's admirable paper I purpose to indicate some of the relative advantages of training such as the Carnegie course provides and of training acquired by actual mill experience. It is strongly indicative of the present and future demand for salesmen with better technical equipment, that some of our large manufacturing companies should be giving serious thought to the problem of scientific selling as opposed to the haphazard methods not infrequently employed by those with a cursory knowledge of mill conditions, processes and equipment.

As J. A. Farrell said in his paper at the 1910 meeting of the Institute:

Good salesmanship and sound business principles in the conduct of the selling of iron and steel are just as essential and vital to the prosperity and continued success of the industry as low costs and up-to-date machinery in the manufacturing practice.

Value of Accurate Knowledge

Granting the necessity, therefore, for more advanced methods of training salesmen, it is of interest to learn what steps are being taken by the members of this body to satisfy present needs for efficient salesmanship and the future demand for selling ability in keeping with the advancement in the art of manufacture. The old days, when steelmaking was in a more experimental stage than at present, permitted the salesmen of a suave and ready type to cleverly evade a technically-accurate reply to the questions of the buyer; but the buyer has been rapidly educated by the technical press; by the information acquired from the limited number of engineer-salesmen or experts direct from the mills; by the fact that a large percentage of the clientele of steel manufacturers are themselves manufacturers of collateral lines, or engaged in industries or industrial pursuits which demand exact and thorough knowledge of the materials employed, from the standpoints of economy, efficiency and safety.

Iron and steel salesmen may be roughly classified in three distinctive types:

First, the usual salesman, evolved without mill experience or technical training from the office man.

Second, the more efficient class who have had as a basis for their work, a technical course either in an engineering school or such as Mr. Camp has described.

Third, the ideal type best equipped for salesmanship that, with or without the foundation of a technical course, has actually gone through the mill.

The first of these, the office graduate, results from the ordinary practice of transplanting men from some other vocation where they may or may not have been successful as salesmen, or transferring them from other office departments to the selling end. This ordinarily means that

they must acquire experience at the expense of the manufacturer or the customer. Occasionally, painstaking effort is made by such salesmen, without the aid of his principals, to acquire some technical knowledge. He may even obtain eventually a fair superficial knowledge of materials, without having been actually engaged in their manufacture. That extra energy and unusual study are necessary to obtain such knowledge, is sufficient to deter many from going thoroughly into the subject; they will rather rely upon facility in concealing their lack of mill experience, and upon their skill and shrewdness in handling their customers.

Salesmen With Technical Training

The value of the man with some technical training, as distinguished from that of the preceding type, increases in proportion to the distance of the salesman from the mill and the facility of communication. Far afield, where weeks may be consumed in referring technical issues to the mills, some engineering knowledge is frequently a necessity; whereas, to the man able to obtain replies from the mills within a few hours, engineering knowledge is not by any means so essential. This knowledge is useful to the salesman in many ways; he occupies the position between the buyer and the mill, which often means that he is the intermediary between the engineer in the field and the engineer at the works. Such a salesman commands a higher degree of respect from the buyer than the one who has to refer all questions involving technical details to the mills; his representations carry more weight with the purchaser and he is able to bring to the buyer's attention in personal discussion, in a way not possible to a man without technical training, special features of the material he is selling. He is not only capable of suggesting to and convincing the buyer of the advantages of modifying his specifications to comply with standard mill practice, but being in personal touch with buyers and knowing the requirements of the market, he can often suggest to the mill changes in their standard product, the desirability of which would perhaps not otherwise be apparent from the mill standpoint.

These advantages which attend the second type or engineer-salesmen are present, but in greater degree, with the third type, the ideal salesman, who has actual mill experience at his command. The young man who has had a training of years in the mills, foundries, machine shops, laboratories and other departments of the steel industry; who has taken advantage of his opportunities; who, in recognition of ability, is taken into the office and subsequently made a member of the selling staff; should, with due regard to the personal equation, become a capable salesman. If he has elements of ambition and energy in his makeup, with the aid of superiors who are closely watching the development of their men, the young workman should develop, if transferred from one department to another, until he obtains a comprehensive experience which will fit him either for the higher technical and mechanical positions or to become that most satisfactory of salesmen, a technical expert. The mental discipline of such a severe course of training is invaluable, even without acquired scholastic knowledge. The history of many who are eminent in the steel business confirms this statement. Others have become efficient in the art of selling and yet have had a continual uphill struggle against the disadvantages due to a lack of inherent knowledge of manufacture only to be acquired by years in the mills. There are few classes of steel products in which, at some time, there does not arise some question of strength, chemical composition, corrosion, wearing qualities, etc., involving metallurgy, chemistry, civil or electrical engineering. Advantageous features of competing products are often brought forward by buyers, involving questions of engineering or technicalities of manufacture, and the salesman with adequate mill experience should be capable of grasping at once the point at issue, which may determine the award of the contract. The engineer salesman can discuss intelligently with the purchaser the finer points involved in the manufacture with a degree of authority which the mere salesman lacks. He has more confidence in explaining the merit of his product or in refuting the claims or meeting the disparagements of competitors.

Of the thousands of young men going into the mills yearly, it is reasonable to suppose there are among them some who may develop into commercial geniuses whose success will rival those of the past. While some of these young men may forge ahead unassisted save by their own energy, it is worth while to consider ways and means by which those most capable may be aided; there can be no question that assistance given in overcoming initial difficulties will be amply repaid by future achievements, either along mechanical lines or in salesmanship to which their abilities may tend. Mr. Camp deals with a system devised to give the ordinary salesman a rapid preparation in technical details, which is a long step in the right direction. It is not to be assumed, however, that even the most intense application and earnest study for five or six weeks can be as effectual a training as an equal number of years spent in the actual manufacture in the various departments of the industry. In this connection, attention may be directed to the system employed by some large engineering companies of engaging, for a portion of their actual working force, young men with prior technical training with the idea of passing them by degrees through the plants until they are finally turned out as expert engineer-salesmen.

Recruit Salesmen From Mills

The purpose of this discussion is, therefore, to deprecate the practice of recruiting sales department forces from the casual applicant and to favor recruiting them from graduates of the mill, with some regard to their primary or acquired education, after they have passed through the necessary stages, either as a result of a carefully planned mill course or of their own initiative.

These engineering or technical salesmen, as they may be termed, are as important to the future of the steel industry as any other element. They are men, who by their years of experience in the shops, mills and laboratories have acquired an intuitive appreciation of accuracy, the habit of using their brains, of devoting concentrated thought even outside of business hours to matters of moment, whether of a technical or business nature. They are inclined from mechanical experience and systematic routine to arrange the facts or sequence of events in negotiations in logical order, assigning to them their relative importance, sub-consciously utilizing the mental discipline acquired during their technical training. Such equipment enables them to win trade, not solely by the exercise of persuasive ability or good fellowship, factors which become less potent as buyers acquire technical information almost equally requisite to intelligent purchasing, but by exact and intimate knowledge and the accuracy and facility with which they can answer any question relating to manufacture and quality which the most experienced and critical customer may propound.

Cobalt Alloyed With Chromium and Other Metals[1]

New Metallic Combinations Develop Wonderful Properties and Tools Made of These Alloys Are Adapted for Rapid Cutting

By Elwood Haynes

For a number of years I have made experiments with a view of finding certain metallic combinations or alloys which would not only resist oxidation and other harmful influences, but would also possess valuable physical properties, which would render them fit for special service. The first decisive step made in this direction was the discovery of an alloy of nickel and chromium in 1898. Immediately following the discovery of the nickel-chromium alloy, I produced an alloy of cobalt and chromium.

As early as 1907, I made alloys or combinations of cobalt, chromium, and tungsten; cobalt, chromium, and molybdenum and cobalt, chromium, tungsten, and molybdenum. I have made alloys of cobalt and chromium containing zirconium, tantalum, thorium, titanium, vanadium, etc. I have also added to the cobalt-chromium alloys, the non-metallic elements, carbon, silicon, and boron. Some exceedingly interesting results have been obtained from these various combinations, and while further investigation is necessary in order fully to determine their chemical and physical properties, a number of them have shown interesting economic possibilities.

Melting the Alloys

The preliminary fusions were made in graphite crucibles by means of a furnace operated by natural gas. I was later obliged to use crucibles of a special composition, not only to avoid the contamination of the metal by carbon from the crucible, but also because they proved more reliable under long-continued heating, than those made of graphite.

Tungsten alloys readily with chromium and cobalt in all proportions. When added in small quantities to the cobalt-chromium alloy, it seems to have little influence on the properties of the combination, but if the proportion rises to 2 or 3 per cent, a notable effect is produced. Generally speaking, the cobalt-chromium alloy becomes harder and more elastic, especially if it contains a small amount of carbon, boron, or silicon.

The following experiment shows the effect of melting the alloy in a graphite crucible: Ninety grams of cobalt, 6.3 grams of tungsten, 18 grams of chromium, together with a small quantity of calcium silicide, were introduced into a graphite crucible. The resulting alloy was very hard, and the crucible much eroded on the inside. The bar could be slightly flattened at one end, and after being made into a cold chisel, showed remarkable qualities. It would not only scratch glass, but also quartz crystal. It was quite tough at ordinary temperatures, and would cut small chips or shavings from a piece of stellite. At a bright yellow heat it showed signs of fusion, and became covered with a skin of oxide.

A Fine-Grain, Elastic Alloy

An alloy was made by melting the following in a special crucible: Cobalt rondelles, 80 grams; chromium, 20 grams; tungsten, 7 grams; calcium silicide, 10 grams, and calcium carbide, 5 grams. As soon as the above were melted, the crucible cover was removed, and 15 grams of an alloy of cobalt and boron was introduced. The crucible lid was then replaced and the heating continued. A heavy, thick slag formed, which was removed before pouring the metal. The resulting bar was very hard and elastic, but only drew slightly under the hammer, and then broke. A cold chisel made from the cast metal cut iron readily. The bar was broken and remelted with about one-third of its weight of an alloy of cobalt, chromium, tungsten, and carbon. The result was a fine-grain alloy which was very elastic, and would draw out to a considerable degree under the hammer without checking. Its elastic limit must have been very high, since when it broke, the pieces were thrown violently.

Taking the alloy of chromium and cobalt as a basis, and holding the proportion of chromium at 15 per cent of the entire mixture, it was found that the alloy gradually increased in hardness with the percentage of tungsten. When the quantity of tungsten rises to 5 per cent the alloy becomes distinctly harder, particularly when forged under the hammer. When the tungsten reaches 10 per cent the metal still forges readily, and a tool formed from the alloy takes a fine cutting edge. This alloy is suitable for both cold chisels and woodworking tools. When the tungsten rises to 15 per cent, the metal can still be forged, but great care is necessary in order to avoid checking. This alloy is considerably harder than that containing 10 per cent of tungsten, and is excellent for cold chisels. When the tungsten rises to 20 per cent, the alloy is still harder, and can be forged to a small extent. It makes good lathe tools for cutting steel and other metals at moderate speeds. When the tungsten rises to 25 per cent a very hard alloy results, which cannot be forged to any extent, but casts readily into bars which may be ground to a suitable form for lathe tools.

These tools have shown great capabilities, particularly for the turning of steel, since they are very strong, and retain their hardness at speeds which almost instantly destroy the cutting edge of a steel tool. The tungsten may be still further increased to 40 per cent, and the alloy will retain its cutting qualities, and for turning cast iron, this alloy answers even better than that containing 25 per cent. When the tungsten reaches 40 per cent or more, the alloy becomes so hard that it will not only scratch glass, but will readily scratch quartz crystal. A small drill made of this material, drilled a hole through the wall of a glass bottle without the addition of any liquid or other lubricant.

Rapid Cutting Tools

A ⅜ inch square cast bar, when ground to a suitable edge, was set in a toolholder attached to a lathe. The workman who had operated the lathe had been able to turn to form, 26 cast iron wheels in 10 hours with a steel tool of the same size. The stellite tool turned 49 of these wheels to form in the same time. The steel tool was ground 50 times during the operation, while the edge of the stellite tool was dressed slightly by a car-

[1]Presented at the Cleveland meeting of the American Institute of Mining Engineers.

borundum whetstone, after its day's work was completed. A set of steel cutters, placed in the boring head of a cylinder boring machine, was able to bore from 27 to 28 holes in 10 hours. These cutters were replaced by others made of stellite, which performed the work in 3 hours and 20 minutes, or a little more than one-third the time. Not only was the speed of the mill doubled, but the feed also, and notwithstanding this severe ordeal, the stellite cutters were only slightly worn, while it would have been necessary to regrind the steel cutters at least two or three times for the same service at slower speed. Some remarkable results were obtained in the turning of steel on the lathe. For example, a cylindrical bar of annealed nickel-chrome steel, about 2.5 inches in diameter, was placed in a lathe and turned with a steel tool at about as high a speed as the steel would permit without burning. The steel tool was then replaced by one of stellite, and the speed at the same time increased to 2 2/3 its former speed. The stellite tool retained its edge under these severe conditions, and produced a shaving weighing 1.2 pounds in 30 seconds. Just what the effect of the alloy will be in machine shop practice, is at present somewhat difficult to determine. In my opinion, however, it will not fully supersede high-speed steel in the machine shop, but in cases where rapid work is the main consideration, it will doubtless replace high-speed steel.

Addition of Molybdenum

When molybdenum is added to a 15 per cent cobalt-chromium alloy, the alloy rapidly hardens as the molybdenum content increases, until the content of the latter metal reaches 40 per cent, when the alloy becomes exceedingly hard and brittle. It cuts keenly and deeply into glass, and scratches quartz-crystal with ease. It takes a magnificent polish, which it retains under all conditions, and on account of its extreme hardness, its surface is not readily scratched. When 25 per cent of molybdenum is added to a 15 per cent chromium alloy, a fine-grained metal results, which scratches glass somewhat readily, and takes a strong, keen edge. Its color and luster are magnificent, and it will doubtless find a wide application for fine, hard cutlery. It cannot be forged, but casts readily, and its melting point is not abnormally high.

If carbon, boron, or silicon are added to any of the above alloys, they are rendered much harder, though their effect is not always desirable, since they tend to render the alloys more brittle.

If either tungsten or molybdenum is added to a cobalt-chromium alloy containing 25 per cent of the latter metal, the hardness of the alloy is rapidly increased. When the percentage of tungsten, for example, reaches 5 per cent, the alloy can be readily forged, and forms an excellent combination for wood cutting tools, such as chisels, pocket knives, etc. When molybdenum is added to the same mixture of chromium and cobalt, much the same effect is produced, though, generally speaking, a smaller quantity of molybdenum is required to produce a given increase in hardness. In some instances I have found it advisable to add both molybdenum and tungsten to the cobalt-chromium alloys. Generally the color and luster of these alloys, after polishing, are magnificent, and they seem to resist atmospheric influences equally as well as the binary alloy of cobalt and chromium.

Removal of Phosphorus By Electric Heating[1]

By Albert E. Greene

Processes for the removal of phosphorus from iron or steel are steadily assuming greater importance in view of the abundance of high phosphorus iron ore and the diminishing supply of pure ore. In the present processes of removing phosphorus by the basic open-hearth or basic Bessemer, or even by electric processes, complete control over the metallurgical conditions is either impossible or has not yet been realized. The removal of phosphorus has so long been accomplished along certain well-defined lines, that when the electric furnace made its appearance metallurgists adhered to the same old reactions used in the older processes and failed to appreciate and take advantage of the new forces at their disposal. It is one object of this paper to set forth more clearly the metallurgical reactions by which phosphorus can be removed from iron and to show the necessity of controlling the conditions and particularly the temperature by means other than combustion in the furnace chamber.

Invariably, the commercial removal of phosphorus has been accomplished by oxidation. The reactions involved in oxidation of phosphorus in general consists first of the formation of P_2O_5, and second, the combination of this oxide with lime, forming calcium phosphate which is held in a slag high in oxide of iron. In the present-used processes, the phosphorus is never removed without the assistance or presence of considerable quantities of oxide of iron. The oxygen for removal of phosphorus in the basic open-hearth process comes largely through the medium of oxide of iron and furnace gases, but not from lime, and the lime itself cannot prevent the reduction of phosphorus back into the metal out of slags from which oxide of the iron is largely reduced, and likewise in the basic Bessemer process, although here the oxygen comes originally from air, yet oxide of iron formed in the blow is the essential carrier of oxygen.

Among the more important metallurgical conditions which control the reactions of phosphorus are the temperature, the presence of oxidizing agents or reducing agents, or both, and the intensity of the resulting oxidizing or reducing conditions, or, in other words, the equilibrium conditions governing the reactions involving oxygen; the influence of slags, including the influence of oxides therein having affinity for oxide of phosphorus, or other phosphorus compounds, the solubility in the slag of such phosphorus compounds, the presence of oxide of like chemical nature to phosphorus oxide and tending to displace it; and the affinity of the reduced metal for phosphorus. In processes where the heat is supplied by combustion it is not possible to maintain complete control over all the above conditions. In the open-hearth furnace the temperature is maintained by combustion of gas in the furnace chamber, and the atmosphere is oxidizing to a greater or lesser extent. Any control over the reducing conditions in an open-hearth furnace must, therefore, come from reducing agents in the metal, and very limited control, if any, can be had over the action of agents such as silicon or dissolved carbon. Since oxide of iron cannot be kept from forming in the slag under influence of the furnace atmosphere, it is apparent that the silicon or carbon in the metal are the agents which must

[1]Presented at the Cleveland meeting of the American Institute of Mining Engineers.

be relied upon to prevent such oxidation.

To hold the strongly-acid oxide of phosphorus in the slag requires a fluxing agent, such as lime, having a strong affinity for phosphorus and which is strongly basic in chemical nature. Calcium phosphate is not at all difficult to reduce, however, at an elevated temperature and with strong reducing agents, and either silicon or carbon is capable of reducing it. This statement holds true even though the carbon or silicon be dissolved in iron, although the intensity of the reducing action is then less, possibly owing to the *pulling action* of the iron itself on these reducing elements. The temperature may, of course, greatly influence the action on the slag of these reducing agents contained in the metal, and may so change their affinity for oxygen as to prevent reduction of certain oxides in the charge, as is the case with carbon and phosphorus.

In an open-hearth furnace calcium phosphate will be reduced from the slag back into the metal when the conditions of equilibrium between the oxides of iron in the slag and the reducing agents in the metal are such as to reduce the amount of iron oxide below a certain limit. Silicon is such a strong reducing agent that practically always, except in certain cases to be noted later, it must be oxidized out of the metal before the phosphorus is attacked. If present in the bath it reacts with any oxide of phosphorus present and reduces it. The presence of large amounts of silica in the slag or lining of the vessel is ordinarily detrimental to removal of phosphorus.

Influence of Carbon

The influence of carbon, the other important reducing agent in the metal, is largely dependent on the temperature, its affinity for oxygen being less than that of phosphorus at low temperatures, and greater at temperatures above about 1,450 degrees Cent. Thus, at low temperatures, carbon dissolved in the iron is not a strong enough reducing agent to reduce calcium phosphate held in a slag high in oxide of iron, but at higher temperatures it is. Thus, either by means of silicon or by means of carbon contained in the metal, or, of course, by solid carbon, the oxide of iron in the slag may be readily reduced, and when such reduction proceeds far enough, calcium phosphate is also reduced and the phosphorus goes back into the metal.

The fact that at low temperatures phosphorus is more easy to oxidize out of the metal than carbon, is the basis of several modifications of the open-hearth process, such as the Krupp washing process, the Bertrand-Thiel process, etc. The slight differences in these processes, such as the heating up of ore, lime, and pig iron together, or the preliminary heating of the ore and lime and subsequent use of molten pig iron, do not change to any great extent the final result as to the method of removing phosphorus. The manner of carrying out this oxidation of phosphorus determines the degree of activity and frothiness of the slag, but essentially the reaction is the formation of calcium phosphate in the presence of considerable oxide of iron.

Basic Bessemer Process

In the operation of the basic Bessemer process, the chemical reactions involved in the separation of phosphorus are in reality practically the same as those in the open-hearth process. In the Bessemer process, temperature is maintained by combustion as in the open-hearth, the combustible materials being the silicon, phosphorus, iron, carbon, etc., of the charge, and also these are burned with an excess of oxygen to produce the necessary heat. Oxidation of the phosphorus results from oxygen of air primarily, but oxide of iron formed from the air acts as a carrier of oxygen, just as in the open-hearth process the slag serves as a carrier of oxygen from the furnace gases.

A large proportion of the heat evolved in the basic Bessemer process results from the oxidation of phosphorus, but it has been found that a certain proportion of silicon is necessary in the pig iron to produce the requisite final temperature. Silicon is oxidized first, together with iron, and thereby the temperature of the bath is raised above that known as the critical temperature between carbon and phosphorus, and above this critical temperature, the phosphorus is not removed appreciably until after both the silicon and the carbon are largely oxidized out. In certain cases with low silicon, oxidation of phosphorus takes place from the early part of the blow simultaneously with that of carbon. This is what would be expected if the temperature were held at about the critical point, since at this temperature the oxidation of carbon and the formation of calcium phosphate take place with equal readiness.

Rephosphorizing With Spiegel

An interesting example of the effect of metallic reducing agents in connection with the basic Bessemer process is the rephosphorization of the metal on the addition of spiegel. The spiegel enters the metal at a high temperature and through a slag containing considerable quantities of calcium phosphate. At an elevated temperature, both silicon and manganese are easier to oxidize than phosphorus and these two elements tend to reduce the phosphorus from the slag back into the metal. From recent experiments, it has been found that at a low temperature phosphorus, on the contrary, is more easily oxidizable than manganese in the presence of lime and can be separated as calcium phosphate without the oxidation of manganese.

On comparison of the conditions in the Bessemer and open-hearth processes, it is seen that the controlling factors in the separation of phosphorus are almost identical. Lime is, of course, necessary to hold the phosphorus in the slag. Combustion is the source of heat and iron oxide is always present and usually in large amounts; silicon oxidizes before phosphorus, and the oxidation of carbon before or after phosphorus is determined by the temperature. Lack of complete control over the reactions resulting from producing the requisite temperature by combustion in the furnace chamber, and necessitating loss of iron as oxide in the phosphate slag, is the very feature which electric heating can correct.

Electric Heating

The electric furnace has been found well-adapted to removing phosphorus by oxidation in the old way, but not commercially, and on careful consideration it is difficult to see how it could do so commercially in competition with the open-hearth. The process of removal of phosphorus in the Heroult furnace, for example, as practiced by the United States Steel Corporation, has been to charge blown steel into the furnace and melt on top of it a slag of lime and iron oxide. The reactions are identical with those in a basic open-hearth. And in spite of the fact that the temperature can be maintained high, the removal of phosphorus in a large furnace takes anywhere from 20 minutes to 1½ hours, according to the amount of phosphorus removed. After the phosphorus is separated in a slag high in oxide of iron, that slag has to be removed in order that the bad effects of the oxides contained therein on the steel may be remedied. It is certainly difficult to see wherein lies the advantage of using costly electrical energy, electrodes, etc., to do the same thing that is done with cheaper fuel heating in a basic open-hearth. And this is gradually becoming realized. After removing this first slag, it is replaced by a reducing

slag to remove the oxygen from the metal. Here metallurgists have gone to the other extreme; they have aimed at and obtained the strongest reducing conditions possible by use of solid carbon and high temperatures. They have used as a measure of the intensity of such reducing conditions the formation of carbide in the slag, and these conditions are such as will readily reduce phosphorus compounds in the slag.

Experiment to Avoid Two Slags

One method of avoiding two slags was proposed and tried out. It consisted in the use of a solid reducing agent, such as fine coke, added to the oxidizing slag after the phosphorus had been taken up by that slag. The object of this was to reduce the iron-oxide of the slag and leave the phosphorus as calcium phosphide. The results of the tests on this process indicated that the use of a solid reducing agent at the elevated temperatures necessary in a steel furnace not only reduces the iron, but also the phosphorus, and the latter goes back into the metal. No other result could have been expected. The explanation of the above reaction is simply that solid carbon has a stronger affinity for oxygen than has phosphorus at the temperature of molten steel in an electric furnace, even though the phosphorus be combined with lime as calcium phosphate. In other words, the reducing conditions acting on the slag are so strongly reducing that phosphorus goes back into the metal.

High phosphorus iron ore has been partially reduced in the presence of lime without practically any of the phosphorus entering the metal, the phosphorus being retained in a slag very high in oxide of iron. Such reduction of iron and separation from phosphorus has been carried out in an electric furnace by using insufficient carbon to completely reduce the ore, since solid carbon, if present, will of course reduce the calcium and iron phosphates at the elevated temperature maintained. The action here of solid carbon is similar to that in a blast furnace, where the presence of an excess of solid carbon causes reduction of oxide of phosphorus and phosphorus is found in the metal. In an electric ore reduction furnace, even with a basic lining, excess of coke will produce the same result and the presence of lime does not overcome this effect. On the other hand, in an electric reduction furnace, when the carbon-reducing agent is limited, the phosphorus does exactly what it does in an open-hearth. These facts show why it is not possible to reduce iron from the first slag in the Heroult steel refining furnace by use of coke without reducing phosphorus back into the metal.

It is a fact that at an elevated temperature oxide of iron is more easily reduced than calcium phosphate, and it is evident that if the proper intensity of reducing conditions be maintained at the elevated temperature, oxide of iron may be completely reduced without reduction of calcium phosphate Such conditions are obtainable by use of a gaseous reducing agent, such as ordinary producer gas, meanwhile maintaining the temperature electrically.

The various reactions of phosphorus associated with iron may be summarized as follows:

At temperatures under 1,450 degrees Cent., phosphorus in pig iron has greater affinity for oxygen than has the carbon in the pig iron, but less affinity for oxygen than solid carbon in the presence of pig iron.

At temperatures above 1,450 degrees Cent., the affinity of the carbon dissolved in iron for oxygen becomes greater than the affinity of phosphorus in the iron, and the dissolved carbon can reduce calcium phosphate in the slag; of course, solid carbon can do this also.

Phosphorus oxidizes in presence of lime and iron oxide to calcium phosphate, in absence of silicon or solid carbon.

Silicon reduces calcium phosphate nearly always, but there may be a range of temperature under 1,450 degrees where phosphorus oxidizes to calcium phosphate more easily than silicon to calcium silicate.

Solid carbon will reduce calcium phosphate contained in a slag or bath of iron and phosphorus will go into the metal.

Calcium phosphate can form without oxidation of iron in presence of carbon dissolved in pig iron at low temperature.

Calcium phosphate can form without oxidation of iron in the absence of carbon and silicon at high temperatures: in other words, above 1,450 degrees Cent.

Oxide of iron can be reduced without reduction of calcium phosphate contained in the same slag.

Solid carbon is a stronger reducing agent than carbon dissolved in the iron, probably because of the affinity of the metal for carbon.

Oxygen Pressure

It is apparent that in all of the present processes the complete control of at least one important factor is either lacking or has not been utilized. In the open-hearth process it is the control of the reducing conditions that is limited, and likewise in the Bessemer process; but in this latter process, the control is further limited by the necessity of raising the temperature by oxidation of elements in the charge itself. In the electric furnace, however, where heat can be produced independently of combustion or chemical reaction, this important factor—namely, intensity of reducing conditions—can be controlled at will and with ease. Up to the present time this fact appears not to have been appreciated by metallurgists, judging by present methods. It is in the complete control of the reducing conditions that important possibilities of electric heating lie, and as this fact becomes more generally recognized and used it is probable that some method will be devised for measuring the intensity of reducing conditions or equilibrium conditions. Since the intensity of reducing conditions is the reverse of the intensity of the oxidizing conditions, the term oxygen pressure may find use as a measure of them.

Control of Reducing Conditions and Temperatures

Among the reactions made possible by control of the reducing conditions and temperature simultaneously, is the reduction of oxide of iron from a slag containing calcium phosphate without reduction of the phosphorus contained therein. Naturally, the origin of the phosphorus containing slag or charge is immaterial; it may be raw ore containing phosphorus, or it may be a slag in which some of the original oxide of iron served to provide the oxygen for combination with phosphorus, the oxide of phosphorus subsequently combining with lime to form phosphate. Or the reducing conditions may be so controlling as merely to prevent oxidation of iron, which, at the same time, causes phosphorus to oxidize and combine with lime.

In the writer's experiments along this line it has been found that at temperatures below about 1,400 degrees the phosphorus was easier to oxidize than carbon from pig iron. And it was found that the phosphorus could be oxidized in the presence of lime without any resultant oxidation of iron and with practically no oxidation of carbon; that phosphorus could be oxidized in the presence of lime without oxidation of manganese; and a very interesting further observation was made, namely, that at certain temperatures between the melting point of pig iron and about 1,350 degrees Cent., phosphorus oxidized in certain cases in the presence of lime without any appreciable oxidation of silicon. This would indicate a reversal of oxygen affinity of these elements—phosphorus and silicon in pig iron in presence of lime.

(*Continued on page 931*)

Reviews of Catalogs and other Trade Publications

REVERSING MOTORS. — The Triumph Electric Co., Cincinnati, has recently issued a 12-page illustrated bulletin, describing its reversing motors for planer drives. Graphic curves and other diagrams show the performances of these motors. With this motor, it is claimed that by properly proportioning the controller resistances, the planer is reversed in less time than is taken by a belted machine, or with a motor drive using a dynamic brake, and that a peak current load never exceeds 50 per cent overload. Greater flexibility is secured as the speed of either cut or return may be quickly varied in small steps without stopping the planer.

FREIGHT HANDLING MACHINERY.—The Jeffrey Mfg. Co., Columbus, has recently issued a 27-page, illustrated booklet, showing the various devices that it manufactures for handling and transporting all classes of freight and packages. These include tray elevators, elevators for handling barrels, arm carriers, conveyors for warehouses and storage buildings, platform carriers, conveyors for bottling works and breweries, roller conveyors, newspaper elevator conveyors, conveyors for lumber mills, pulp mills, ice houses, etc. This catalog is very complete and the illustrations show well the extent to which machinery of this sort can be used.

HOISTING BUCKETS AND TUBS. — The Brown Hoisting Machinery Co., Cleveland, has issued a 56-page catalog, containing a number of excellent illustrations, and describing its line of buckets and tubs, which are adapted to a great variety of uses. The line includes the following: Two-rope ore, coal and excavating grab buckets; single-rope grab and contractor's grab buckets; dragline and automatic dumping shovel buckets; automatic tubs, with or without casters and special buckets. Some of the illustrations show buckets in operation. Many buckets of these various types are in successful use for handling iron ore, limestone, coal, coke, slag, etc.

LIFTING MAGNETS AND MAGNETIC SEPARATORS. — The Cutler-Hammer Mfg. Co., Milwaukee, recently has issued two new bulletins, one describing circular type lifting magnets while the other is devoted to magnetic separators. The 48-page lifting magnet bulletin contains many illustrations of this device employed for a large variety of purposes. Considerable new data and figures are included as well as a table containing the particular adaptations of the various sizes from the 18-inch to the 62-inch magnets. The magnetic separators described are for use in plants wherever it is desired to continuously remove the magnetic contents from non-magnetic bulk material.

MANILA ROPE.—The C. W. Hunt Co., New York City, has issued a 48-page, illustrated catalog, describing its manila rope for transmission and hoisting purposes. A few pages are devoted to a brief description of the method of manufacturing manila rope, the illustrations showing manila hemp in various stages. A list of technical words relating to cordage is of especial value. The subject of transmission rope is treated rather fully, the band, coupling and tension systems being compared. Explicit directions, accompanied by numerous illustrations, are given for correctly splicing rope, and for tying a great variety of knots, hitches and bends. A number of appendices contain data and tests on manila ropes.

AUTOMATIC CHUCK. — The Wahlstrom Tool Co., 346 Carroll street, Brooklyn, has issued a pamphlet describing its automatic drill chuck. With this chuck it is unnecessary to stop the drill press spindle or to change drills or reamers. No wrench is used and it is not limited to regular drill press work, but may be used to advantage on boring or milling machines. The booklet also contains a price list. Another pamphlet of the Wahlstrom Tool Co. describes the Wahlstrom oil cup. It is claimed for this cup that a wire can be inserted to clean out clogged oil channels and the cover readily opened with the spout of the oil can. The cover is spring-actuated and its mechanism dust-proof. The cups are made in all commercial sizes and are nickel-plated.

COPPER-CLAD STEEL WIRE.—The Duplex Metals Co., Chester, Pa., has issued an attractive, 46-page, illustrated catalog, in which it describes briefly the manufacture and advantages obtaining from the use of copper-clad wire for telephone service. A short historical sketch traces the attempts that have been made to make a satisfactory wire consisting of steel surrounded with copper, and culminating in the present product made by this company. The booklet contains many illustrations, some of which are reproduced in two colors showing the appearance of a cross-section of copper-clad wire. Price lists are given, together with tabulated data of the comparative characteristics of copper and copper-clad wire, as well as considerable information regarding galvanized and other wires.

MULTIPLE STRAINERS.—A 12-page, illustrated booklet devoted to multiple strainers, has been issued by the Lagonda Mfg. Co., Springfield, O. These strainers are designed for use in power plants that take circulating or boiler feed water from a natural supply such as a river or pond, where the water is apt to contain solid matter, leaves, ice, sticks, sand, etc. Screens used for this purpose frequently foul and obstruct the flow of the water. This strainer, so it is stated, can be placed at any angle in horizontal or vertical pipe lines, can be installed inside or outside the plant and is suitable for either high pressure or vacuum lines. In addition, it can be cleaned while in operation and without interfering with the flow of water. To guard against corrosive action, all working parts, in contact with the water, are made of non-corrosive bronze or brass.

WATERPROOFING MATERIAL. — The Integral Waterproofing Co., 50 Church street, New York City, has recently issued a 24-page booklet, in which is described the waterproofing materials that it manufactures. This material is intended for use in making concrete and cement structures waterproof. This waterproofing material is a light, white, powder with a calcium base, that is highly water-repellent and is not a foreign substance, but is composed of the same material as the principal element in the cement with which it combines chemically. It is said to be a scientifically-manufactured compound, which undergoes chemical action under the setting of the cement and becomes an integral part of the concrete. The booklet also contains directions for use, tables on cost data, impermeability tests, and some interesting illustrations of some of the works which have been waterproofed.

LIGHTING SPECIALTIES.—In a handsomely illustrated, 80-page catalog, issued by the Benjamin Electric Mfg. Co., Chicago, its extensive line of wireless clusters and lighting specialties is described. Among the new articles shown are single unit ceiling fixtures, porcelain-lined twin sockets, lever and pull angle sockets and ceiling and pendent lock guards. Considerable interesting data on industrial illumination are included and it is stated that good illumination costs about 0.5 per cent of the average workman's wages, but his efficiency is increased many times this amount. A unique line of reflector sockets and cluster fixtures has been developed by the Benjamin Electric Mfg. Co. for this work. Three general styles of reflectors are employed, which include the deep bowl and shallow bowl types, as well as the flat cone type. The intensity of illumination, measured in foot-candles, required in various manufacturing plants and buildings is included in a table.

OIL SWITCHES.—A bulletin recently published by the General Electric Co., Schenectady, N. Y., contains descriptions and illustrations of the oil switches manufactured by the company, and which are intended primarily for use in small and isolated alternating current plants, of voltages not greater than 3,300. The bulletin also contains connection and dimension diagrams, with formulas useful in selecting oil switches. Other bulletins recently issued by the company include No. 4975, which is a revision of No. 4613, devoted to the synchronism indicator; No. 4973, relating to resistance units for various motor-starting and speed controlling rheostats; No. 4977, describing control apparatus designed for use where single-car operation predominates, and No. A4002, which describes the polyphase maximum watt demand indicator, suitable for recording the maximum load of alternating current circuits, irrespective of power factor and voltage fluctuations. All of these bulletins are well illustrated.

WELDED PIPE.—"The Manufacture of Modern Welded Pipe" is the title of an unusually well-illustrated and conveniently arranged 32-page booklet, issued recently by the National Tube Co., Pittsburgh. The process of making butt-welded and lap-welded pipe is followed from the iron mines, to the finished product. The illustrations, many of which are in two colors, include the following subjects: Ore mining on the Mesabi Range; unloading ore from vessels; ore pile and blast furnace; pouring molten iron into a converter; converters in action; molds being stripped from ingots; plate partly finished; charging plate into butt-weld furnace; drawing butt-weld pipe; welding rolls; lap-weld furnace; testing pipe, etc. A number of tables are reproduced, showing the results of tests on iron and steel butt and lap-welded pipes and tubes; also results of investigations of the corrosive action of iron and steel in actual service. It is stated that galvanizing or suitable bituminous coatings will be applied to pipe when specified; also that a reinforced coating, consisting of a covering of heavy burlap, saturated with bituminous compounds and tightly wound over the regular coating, has been used recently with good success.

CUPRO-NICKEL STEEL

And the Work of G. H. Clamer—Control of Monel Metal.

Referring to an article published on page 640 of THE IRON TRADE REVIEW of Oct. 3, G. H. Clamer, of Philadelphia, writes as follows:

Editor, THE IRON TRADE REVIEW:

I note in your Oct. 3 issue, an article by Mr. Kirby Thomas, on nickel-copper-iron alloys. Mr. Thomas is evidently not familiar with the work which I have done in connection with these alloys. I am enclosing a paper which I read before the American Society for Testing Materials in 1910, and beg to state that patent on such a steel has been granted to me. Dr. C. F. Burgess has acquiesced in my priority. Mr. Thomas has hit the nail on the head when he suggested that one reason for the apparent indifference to the important results indicated by Dr. C. F. Burgess in connection with such alloys is the fact that the market for monel metal is controlled by the International Nickel Co. This company refuses to sell monel metal for alloying purposes, and has temporarily, at least, blocked the introduction of this steel, for this reason.

Mr. Clamer's paper on cupro-nickel steel, and his conclusive research in the field of this new steel alloy, should have been duly noticed in connection with the subject, the article referred to in the above communication. Mr. Clamer, after stating that cupro-nickel steel can be produced from monel metal at a lower cost than 25 to 35 per cent nickel steels, says:

It is also possible to make the steel directly from Sudbury nickel ores by simply smelting and Bessemerizing them to eliminate the iron to the extent desired, roasting the matte produced, and finally reducing the combined oxides resulting from roasting the matte. It is thought that, either by the use of monel metal for making the steel alloy, or by direct production of it from the ore, the cost of production might be sufficiently reduced to make it attractive for roofing, gutters, spouts, ventilators, and for many other uses where its resistance to corrosion and its low coefficient of expansion will warrant the cost. Sheets of cupro-nickel steel can be produced to sell at a very much lower price than copper sheets, and probably from two to four times the price of commercial coated iron and steel sheets; but since the alloy is about twice as strong as the soft steel and three times as strong as copper sheets, thinner gages can be used. The alloys at the higher end of the series, as I have said before, are non-rusting.

Steels within this range of proportion of copper and nickel have a crystalline structure, such as is possessed by nickel steels carrying above approximately 25 per cent of nickel, or with a somewhat lower percentage of nickel if carbon is present in an appreciable amount,—in other words, like nickel steel within the crystalline range,—the copper apparently acting very much like nickel. It will be noted that the physical properties are very similar to those of the same nickel steels without copper.

Noting the curious and unexpected results obtained with these high copper-nickel alloys, I became curious to know what would be the effect of replacing part of the nickel in nickel steel within the pearlitic range by copper, and accordingly made such steels with from 1 to 8 per cent of monel metal, in which the proportion of nickel to copper is roughly 2.5 per cent of nickel to 1 per cent of copper. Here again the copper really acts like so much nickel, at least when present in these relative proportions, and it is possible, therefore, to produce a steel of practically the same physical properties as nickel steel, at very much reduced cost.

The valuable properties of nickel steel, i. e., steels carrying below 6 per cent of nickel, have, of course, long been recognized, and recently the value of copper as a valuable constituent of steel, instead of a metal to be looked upon as a detrimental impurity, has also become recognized. It is probably not quite so surprising, therefore, that the joint addition of copper and nickel within the range of proportions here considered is productive of valuable results. The addition of these two metals in combination seems to have the same effect upon the steel as if they were individually added, the copper in its effect really being about the same as so much added nickel. It is possible, therefore, to replace part of the nickel in nickel steel by copper, without materially altering its physical properties.

Ore Receipts at Lake Erie Ports

Iron ore shipments during October were 7,010,219 tons, of which 5,913,493 tons went to Lake Erie ports, distributed as follows:

Port.	October, 1912.
Buffalo	906,541
Erie	177,685
Conneaut	1,056,775
Ashtabula	1,234,953
Fairport	278,231
Cleveland	1,221,572
Lorain	622,790
Huron	76,177
Sandusky	.....
Toledo	287,511
Detroit	51,258
Total	5,913,493

Will Roll Merchant Shapes

The Forged Steel Wheel Co., Butler, Pa., allied with the Standard Steel Car Co., will install a merchant mill for rolling a variety of merchant shapes. The McClintic-Marshall Construction Co., Pittsburgh, has taken the contract for the building which involves about 2,000 tons of structural steel. The wheel company, a number of years ago, built an open-hearth steel plant of six 50 to 60-ton furnaces with equipment to make slabs for its forged steel wheels.

New General Sales Agent

The Domhoff & Joyce Co., Cincinnati, pig iron and coke brokers, with offices in Cleveland, Chicago, Indianapolis and St. Louis, has transferred W. J. Thompson, who has had charge of the Chicago office, to the managership of the St. Louis branch, and W. G. Maguire, formerly of the St. Louis office, has been made general sales agent of the company with headquarters at Cincinnati.

Removal of Phosphorus By Electric Heating

(*Continued from page 929*)

A fusible slag results from proper proportions of acid and basic radicals. It has been found that the silica content in the slag may be as high as 30 per cent without apparently hindering the removal of phosphorus. Phosphorus was separated in slags containing this amount of silica and yet practically no iron oxide was present in that slag. This points to the possibility of a low-melting point slag for holding phosphorus.

The reduction of oxide of iron from a charge or slag containing phosphorus as calcium phosphate, without reduction of the latter, requires essentially the same control of the conditions as does the selective oxidation of phosphorus in presence of lime, forming calcium phosphate without oxidation of iron. Electric heating is the only practical way of accomplishing such control.

It is not to be doubted that metallurgists will very soon appreciate the distinction between various degrees of oxidation and reduction, where they have not already done so, since in so many cases undesired elements can be separated from metals by oxidation of the impurity and reduction of the metal. When this becomes generally appreciated it is prophesied that electric heating will come into use to an extent that is now hardly thought possible.

Buy Land.—The Deynon interests in New York have combined with western capitalists in the purchase of a large amount of real estate located on the water front in Long Island City. This is said to be the initial step in a plan for establishing a number of industrial plants in that section.

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The Election and Business

The presidential campaign of 1912 was characterized by several important features of special interest to business men. Fortunate indeed it is that the decision of the voters was decisive. Had the contest been thrown into congress, or had the result been so close as to be dependent upon legal decision in one or two states, the effect upon industrial affairs would have been extremely depressing. If, for example, the result had hinged upon California, in which state the legality of many votes is in doubt, the country might have witnessed a repetition of the trying times of the winter of 1876-77, when the Hayes-Tilden controversy was pending.

The campaign demonstrates more impressively than any other that the tradition that a presidential year is necessarily a period of depression is not well founded. In some past presidential years, business has been good, in others it has been bad, and still others it has been fair. But the active and sound prosperity of 1912 is without a parallel in the history of years of national political excitement. Throughout the ante-convention contest of unequalled bitterness, as well as throughout the campaign proper following the nominations, the tide of prosperity steadily rose. The prospect of a change of administration had no terrors for buyers or sellers. The continuance of industrial activity was probably due in part to the fact that the country had become so accustomed to agitation of many kinds that it could not easily be disturbed. But the more important factor was the faith of the people, not seriously shaken by campaign attacks, in the high character and great ability of all of the three leading candidates for the office of chief executive of the nation. Few people could be persuaded that Taft was as weak or that Wilson or Roosevelt was as danerous as painted by opponents. There was also a general belief that though there seemed to be wide difference of opinion among the parties, it was not clear that in trying to carry out party promises the successful party's method would differ as widely from those of the other two parties as the declarations of platforms indicated. It was evident, for example, that in dealing with the so-called trusts, no candidate for the presidency could say exactly what he would do if elected, because it would be necessary for him to be guided by experience.

Another striking feature of the campaign was the unprecedented extent to which business men were divided. Although more than at any time since 1896, problems affecting business affairs were being discussed, men in all kinds of manufacturing and selling pursuits were distributed among the parties as they never have been in past years. We believe that this was well for all concerned. The feeling had become too common that men of capital had no interests in harmony with those of men dependent upon their own exertions unsupported by capital. In the recent campaign, class distinctions were lost sight of as old party affiliations were abandoned. It was discovered that many men of wealth were just as anxious to improve conditions as were those not rich in worldly things.

The causes of panics and periods of depression are many and students of events often disagree in trying to trace exact causes and effects, but to one general proposition all agree—that danger begins when men become afraid, regardless of whether there is real foundation for fear. Having kept their courage through months of political disturbances, there is now good reason for hoping that business men will not begin to tremble unless genuine danger of disaster confronts them If the president-elect adheres to his declarations, made just before and immediately after the election, legitimate business will not be disturbed. On the Saturday preceding the election, Governor Wilson said on the tariff:

"It must be handled very prudently, so that no honest toil may be interrupted, no honorable or useful enterprise disturbed; must be dealt with by slow stages of well considered change—change whose object shall be to restore and broaden opportunity, and destroy nothing but special privilege and unwholesome control."

If there is to be any change in the tariff, no declaration could be more satisfactory than that of Governor Wilson. On the trust question, he said:

"The trust question must be dealt with in the same way with this distinct and single program, to destroy monopoly and to leave business intact, to give those who conduct enterprise no advantage except that which comes by efficiency, energy and sagacity, those

only fountains of honorable wealth, every man rewarded according to his insight and enterprise and service, his mastery in an open field."

The above declaration, like that on the tariff, is all that could be desired. Following his election, Governor Wilson said he had no feeling of triumph, but a feeling of profound responsibility. "There is," he added, "absolutely nothing for the honest and enlightened man to fear." Every citizen ought also to feel his responsibility. The new president has before him, at the beginning of his administration, greater problems than have been faced by any president since the Civil war. Woodrow Wilson enjoys the confidence of the people to a greater extent than does his party. One of his most difficult tasks will be to resist the influence of the worst men of his own party. He will need, and ought to have, the support of the best men of all parties as long as he adheres to the policies above announced.

Loss of Foreign Ore

Prosperous conditions of the iron and steel industry of the British Isles and of continental Europe find an echo in the recent announcement that a leading seller of foreign ore is to close its American offices because of the diminished tonnage of Spanish ores it now has to offer to the blast furnaces of this country. So heavy is the demand for this ore in this seller's primary markets abroad that the surplus quantity to be offered on this side of the Atlantic ocean has been materially reduced. A contributing factor which renders the American market much less attractive under prevailing conditions is to be found in the extraordinarily high level of trans-Atlantic ocean freights now prevailing, especially from Mediterranean ports. This condition is one which weighs directly upon the foreign ore seller because he makes his quotation on ore laid down at the eastern seaboard, and consequently must absorb the freight charge. The result is either a price which is too high to be competitive in the eastern market or one too low to net the seller the return afforded by his more strictly home market.

The conditions which now affect the position of the seller of foreign ore on this side will bring, this year, the imports of Mediterranean ores to this country to the lowest figure in a number of years. The sharpest decline in imports will be in Spanish ore, the shipments of which to eastern Pennsylvania furnaces in the five years ended with 1911 averaged about 270,000 tons. The imports of Spanish ore in 1912, according to statistics for the greater part of the year, will probably be not far from 100,000 tons for the 12 months. In 1910, 439,868 tons of this ore were imported. The only trans-Atlantic ore this year which will maintain its recent position as to the extent of the movement will be the Swedish material. This is due primarily to the fact that some large long-time contracts for this ore are now in force in the east, one in particular being that of the Bethlehem Steel Co., which calls for 250,000 to 300,000 tons per annum. It is indicated at present that the total Swedish imports during the current year will reach about 300,000 tons. In 1911, they amounted to 219,238 tons, in 1910 to 259,911 tons, and in 1909 to 120,564 tons.

The decline in trans-Atlantic ore shipments to this country this year in response to the more prosperous trade conditions abroad and to the high freight markets again emphasizes the declaration frequently made by close observers, that the trans-Atlantic ore deposits do not represent a dependable base of supply for the blast furnaces in the eastern seaboard belt. The distances of transportation are so great and the offerings are so proportioned to the prosperity of the European iron and steel industry that the eastern furnace men cannot be assured of maintaining from year to year an exact mixture. Furthermore, neither can the eastern furnaces accept, because of the high delivered cost, the Lake Superior district as their one source of supply nor can they satisfy their full demands from the limited development of local domestic mines in the east. They are likely to find, however, as they are now doing, an increasing source of supply on the North American continent, external to this country, including Cuba, Newfoundland, Nova Scotia and the revived South American workings such as Venezuela. The position of greatest advantage for a liberal sale to the eastern market from any outside base of supplies appears now and for the future to be held by those operations on the North American continent which are accessible by ocean route to the eastern seaboard.

Pig Iron Production and Capacity

Pig iron was made in the United States during October at the record rate of 32,000,000 tons a year, including charcoal pig iron, as indicated by our monthly blast furnace report, published a week ago. This is a new record rate, passing that of the winter of 1909-10.

The performance, considering the conditions, reinforces the estimate already made in these columns, that the country's full commercial pig iron capacity, under ordinary conditions, is between 33,000,000 and 34,000,000 tons. The October production, it must be remembered, could not be continued for a twelvemonth by the furnaces in blast during that month. October is always a month of particularly good performance by individual blast furnaces, March being another good month for operation. Then it is to be considered that after a few months of relatively full operation, the number of furnaces requiring to be blown out for relining increases, so that it would not be fair to add to the present rate of production an allowance for the full number of furnaces now idle, to obtain the country's full capacity. Some of the furnaces now idle must be taken as balancing furnaces now in blast but which will have to be relined during the next twelvemonth.

A capacity even of 34,000,000 tons a year is not large for this country for 1913, considering the demand there has been in the past, which has, as a rule, involved a doubling every 10 years. Indeed, by comparison with the records of the past, a capacity of 34,000,000 tons is small rather than large, for the present, and the actual condition today is that while possibly the furnaces are in existence and physically fit to operate, the raw materials are not available. As has been pointed out before, the trade is so aligned at the present time that the governing element is not the physical capacity of the blast furnaces, but the supply of coke.

MEN OF THE IRON TRADE

Charles E. Pless, representing the Adder Machine Co., Wilkesbarre, Pa., has been transferred to Roanoke, Va.

Peter Hott, formerly superintendent of the foundry operated by the C. & G. Cooper Co., Mt. Vernon, O., has resigned and has located in Milwaukee, Wis.

D. H. McDougall, assistant general manager of the Dominion Steel Co., has been promoted to the general managership following the resignation of M. J. Butler.

Frank Crockard, Birmingham, Ala., vice president of the Tennessee Coal, Iron & Railroad Co., has gone to French Lick Springs, Ind., where he will remain for several days, later going to Chicago.

Fred H. Daniels, chief engineer of the American Steel & Wire Co.'s plants in Worcester, Mass., is a private patient in the Johns Hopkins hospital in Baltimore, Md., where he recently underwent an operation.

J. Leonard Replogle, formerly assistant to former President Charles S. Price, of the Cambria Steel Co., Johnstown, Pa., and who was recently made a vice president, has been appointed general manager of sales.

Herman Neiter, formerly general sales manager of the Kennecott Co., Chicago, has been appointed manager of the eastern sales department of the Blaw Steel Construction Co., Pittsburgh. He will have offices at 165 Broadway, New York.

T. R. Chunn, manager of the steel ceiling department of the Edwards Mfg. Co., Cincinnati, maker of sheet metal building material, has left for Jacksonville, Fla., where he will have charge of the opening of a new branch office of the company.

W. H. E. Royce, formerly general superintendent of the coke operations of the Republic Iron & Steel Co., Youngstown, O., at Uniontown, Pa., has assumed the management of the Connellsville Basin Coke Co., which has 200 ovens at Rock Forge, W. Va.

Robert McGlurken, who has resigned the position of superintendent of the Hannah furnace, of the Republic Iron & Steel Co., Youngstown, O., to take a position in Maysville, Wis., has been presented with a gold watch by employes of the Mahoning valley stack. J. N. Rees, general superintendent of blast furnaces, made the presentation speech.

Charles M. Schwab has accepted an invitation to be principal speaker at the annual banquet of the chamber of commerce, Youngstown, O., on Nov. 26. Mr. Schwab is scheduled to deliver an address along business lines and will have for his subject, "Sentiment in Business."

O. H. L. Wernicke, of the Globe-Wernicke Co., has been elected president of the Wernicke-Hatcher Pump Co,. Grand Rapids, Mich., which has been incorporated with a capital stock of $150,000, to engage in the manufacture of air pumps. Negotiations are under way for building a factory to house the enterprise.

Alfred Weeks, Johnstown, Pa., has been chosen chief mechanical engineer of the Canadian & Northwestern Steel Co., Vancouver, B. C. Mr. Weeks was graduated from the mechanical department of the Western University of Pennsylvania, Pittsburgh, in 1904, and later worked for the Cambria Steel Co., Johnstown, Pa.

J. J. Mahoney, general manager of the Cahill Iron Works, Chattanooga, Tenn., was elected second vice president of the Chattanooga Manufacturers' Association, at the recent annual meeting of the society. Morrow Chamberlain, secretary and treasurer of the Roane Iron Co., Rockwood, Tenn., was elected treasurer of the organization.

B. E. Hutchinson, formerly engineer and steel mill superintendent of the Grand Crossing Tack Co., Chicago, has severed his connection with that company and gone abroad under contract with the Blair Open-Hearth Furnace Co., Ltd., of London, to take charge of the engineering work in connection with the installing of Blair ports in England and upon the continent.

Henry K. Swinscoe, who for seven years has been assistant superintendent of the South Works of the American Steel & Wire Co., Worcester, Mass., has been made superintendent of the Morgan Spring Co., Worcester, succeeding Matthew R. Fish. Charles Morgan, for many years connected with the Morgan Spring Co., as treasurer and assistant treasurer, has severed his connection with the concern to become auditor for the Norcross Bros. Co., Worcester, building contractors.

John Hulst, chief engineer of the Ohio Works of the Carnegie Steel Co., at Youngstown, O., has been appointed successor to Edward E. Slick, chief mechanical engineer of the company, who resigned to accept a position with the Cambria Steel Co., Johnstown, Pa. Mr. Hulst is a graduate of the University of Michigan, and is well known, as a mechanical engineer, in the steel industry.

Charles H. Topping, Bessemer building, Pittsburgh, sales engineer, dealing in complete equipment for contractors, mines and mills, has been appointed exclusive representative in the Pittsburgh territory for the following lines: Koehring concrete mixers, Weiner industrial cars and railways, Standard combination woodworkers, Symons column clamps and New York flexible metal hose. In addition he handles complete lines of hoisting engines, rock and ore crushers, steam engines and boilers, buckets, etc.

E. H. Mumford, of the Mumford Molding Machine Co., Plainfield, N. J., addressed the New England Foundrymen's Association at its regular monthly meeting which was held at the Exchange Club, Milk and Batterymarch streets, Boston, Wednesday evening, Nov. 13, upon the subject, "Recent Phases of Molding Machine Development." Mr. Mumford illustrated his remarks by stereopticon views. The usual dinner and business meeting of the association was also held on this occasion.

Edward E. Slick has been appointed by President W. H. Donner, as general manager of the Cambria Steel Co., Johnstown, Pa. H. W. McAteer has been named comptroller. Both will have headquarters in Johnstown. Mr. Slick is now chief mechanical engineer of the Carnegie Steel Co. He was employed by the Cambria Steel Co. 22 years ago, since being connected with the work of building the Gary and Duluth plants. Mr. McAteer has held the position of assistant auditor of the Carnegie Steel Co., for the past 17 years. Both positions are newly created additions to the present organization.

BRITISH AND CONTINENTAL MARKETS

BRITISH IRON TRADE

Office of THE IRON TRADE REVIEW,
Prince's Chambers, Corporation St.,
Birmingham, Eng., Nov. 2.

Pig Iron. — The pig iron market during the past week has made some progress in overcoming the effect of the war scare. Yesterday's quotation on the Cleveland market was 67s 2d ($16.44), prompt cash 67s 6d ($16.52) one month, and 67s 11d ($16.62), three months. The returning confidence no doubt accounts for increasing readiness to buy for next year. There has been an advance on the week of about 10d per ton. In the Derbyshire district, supplies have been somewhat reduced, by the damping down of the Clay Cross furnaces. On the other hand in Middlesbrough, Bolckow Vaughan & Co. have blown in an additional furnace. In the Sheffield district the great scarcity of pig iron is causing serious inconvenience; and the starting of two or three additional furnaces has so far made practically no difference. There are heavy purchases of Swedish pig iron for urgent steel making needs. An additional furnace has been put in operation in the Barrow district, and it is notorious that others would be started if men could be obtained. The glowing reports from America this week have given a further stimulus to prices, and the most remarkable feature of the week is the decided strengthening of the Manchester market, usually extremely sensitive to any weakening influences which happen to be abroad. Smelters everywhere are in a very strong position, and not at all anxious for business. It is perfectly clear that, with such heavy orders in the finished department, still larger demand must develop for raw material.

GERMAN IRON TRADE

Berlin, Oct. 26.

It is asserted that the Balkan war has as yet not exercised any material influence on German business in pig iron. The German coal syndicate has advanced the price of coke by 1 mark (23½ cents) to take effect from April 1, 1913. When the pig iron syndicate, on Sept. 30 last, raised prices by about 3 marks (70½ cents) on an average, a further advance was contemplated in the event of coke prices being raised. The pig iron prices for delivery during the first half of 1913 has now been advanced 1 mark (23½c) per ton (2,240 pounds). Luxemburg pig iron is therefore likely to be raised 2m (47c) to 3m (70½c). Hoop iron is now quoted 145m to 150m ($3.407 to $3.525), compared with 142.50m to 147.50m ($3.348 to $3.466), and price advances of other products are expected. Shape iron and half product prices are to be fixed shortly for the first quarter of next year, but it is thought unlikely there will be a further increase in the quotations. The small iron trade is very well occupied, but it is complained the high prices of the raw material curtail profits.

RUSSIAN IRON TRADE

(Specially Contributed.)

St. Petersburg, Oct. 29.

The Russian iron industry, which has been exceptionally prosperous for the last few years, continues to be so to date. A statement issued by the Russian Metallurgical Union called the Prodameta shows that during the first three-quarters of this year the business done represents 38,301,000 poods of merchant metal, against 40,664,000 poods in the corresponding period of 1911. (A pood is equal to 36 pounds.) This is the only decrease in the list of any importance. Sheet metal figures are 11,204,000 poods against 10,337,000. Girders and sleepers were 14,080,000 poods, against 12,889,000. Rails, 26,992,000 poods, against 17,943,000; wheel tires, 1,582,000 poods, against 1,559,000, and axles, 558,000 poods, against 691,000. The respective totals are 92,777,000 poods and 84,083,000 poods for the first nine months of 1912 and 1911 in the order given. It will be observed that the increase in rails is heavy, due to the great revival in railway constructional enterprise in the country. It is difficult to account for the decrease in merchant iron, considering the great industrial and commercial activity in the country since the beginning of the year. The problem is referred to in the official report quoted from, but no effort is made to explain it.

BELGIAN IRON TRADE

Brussels, Oct. 26.

Bouyancy still marks the Belgian iron markets and no bad effect is as yet to be noted as a result of the outbreak of hostilities in the Balkans. Scrap iron is harder at 59 francs to 63 francs ($11.80 to $12.60). Girders for home consumption have been advanced 10 francs ($2) to 165 francs to 180 francs ($33 to $36) per ton. There has also been a further increase in the price of steel bars for export; these are now quoted 1 shilling (24 cents) dearer at £6 3s to £6 5s ($29.92 to $30.41) per ton, f. o. b. Antwerp. Foreign trade statistics give the imports of iron ore for the first nine months of the year at 4,762,000 tons compared with 4,159,000 tons a year ago, while exports aggregated 503,000 tons and 376,000 tons respectively. Foundry iron imports were 598,000 tons, against 498,000 tons. Imports of billets, blooms and sheet bars were 52,000 tons, and exports 72,000. Exports of rails reached 126,000 tons, of plates and sheets 143,000 tons, of girders 67,000 tons.

FRENCH IRON TRADE

(Specially Contributed.)

Paris, Oct. 31.

Notwithstanding the close attention which is being paid to the military developments in the Balkans, the iron market here is firm and even active. Prices tend upward. Pig iron and half-product works find it increasingly difficult to cope with the urgent calls, and fresh business is only accepted if unusually long delivery time is allowed. In the Longwy district, foundry pig iron No. 3 has recently been advanced from 82-84 francs ($16.40-$16.80) to 90 francs ($18) per ton for next year delivery. The finishing trade remains in a very prosperous position. Plates and sheets meet with a large demand; girders and scrap iron are doing well, also rails, and rolling stock mills have good contracts on hand, especially for home consumption. Imports of iron ore into France during the first nine months of the year were 1,909,000 tons against 1,015,000 tons and 961,000 tons respectively in the two preceding years.

Producing Sound Steel Ingots By Compression[1]

How Segregation, Piping, Blow-Holes and Other Imperfections in Steel for Rails and Other Rolled Products May Be Prevented

By Benjamin Talbot

The problem of segregation and cavities in steel ingots is a subject which has given and is still giving metallurgists, engineers and operators considerable concern.

This question has come more into prominence lately in this country, due largely to the desire of railroad engineers to secure a better rail than they have obtained in the past, as the service they now demand is increasing in severity. The rails made in the United States are as good as those made in other countries, but the conditions of service, and the extremes of climate are more severe and, consequently, more breakages occur.

Large and Small Ingots

Various reasons have been advanced as to why rails may not be as good in quality today as in the past. Some engineers consider that modern methods of manufacture, designed chiefly to obtain large output, tend to reduce the standard of excellence of more deliberate methods. Others think that 4-ton ingots do not give as good results as those of 2 tons. Again, it is stated that the 100-ton heat in one ladle is too large and is a step in the wrong direction in casting.

My experience with ingots of different sizes in rolling rails of 85 to 100-pound sections indicates that the weight has no bearing upon segregation, blow-holes and other imperfections.

A number of years ago, at Pencoyd, Pa., two ingots were bottom-poured and cast at the same time from the same center runner. The one ingot was 20 x 24 inches and the other, 13 x 16 inches. The steel was acid open-hearth, containing carbon, 0.43 per cent; phosphorus, 0.062 per cent, and sulphur, 0.069 per cent. At the same place in each ingot, where segregation generally concentrates, I found 0.67 per cent carbon; phosphorus, 0.13 per cent, and sulphur, 0.18 per cent in the larger ingot, and 0.74 per cent carbon; phosphorus, 0.16 per cent, and sulphur, 0.27 per cent in the smaller one. Bottom-pouring at that time was considered better for the prevention of surface defects, but blow-holes developed on the surface of the ingots, and the smaller ingot was worse in every respect than the larger one.

Large Ladle Heats

The question of 100-ton ladle heats is one of great importance. In my opinion this is distinctly a step in the wrong direction, as it places a premium on careless and slovenly casting work. We find that in order to empty a 100-ton ladle in the necessary time to prevent skulling that very large nozzles are used, probably as large as 2.5 inches in diameter. The pressure of this large quantity of steel rapidly enlarges the nozzle and it would be interesting to know what size the nozzle is when the last portion of the heat is poured. Large nozzles cause heavy washing up the sides of the molds and this gives surface defects. There is no doubt but that smaller ladle heats, poured with as small a nozzle as the heat will permit, give the most satisfactory results.

We now come to the question of producing sound steel ingots for the heavy trades. There are various methods, but we are forced to rule out some of the processes because of their cost. Sir Robert Hadfield suggests the use of a sink-head to feed the pipe which forms by the shrinkage of the metal from its liquid to its solid state. To do this effectively, some system of keeping the surface fluid must be adopted. There is no doubt but that if this is carried out the sink-head will feed the ingot and the cavity will be in the head. The question to be decided with this method is whether it is commercially applicable to the large output required from a modern rail mill.

Use of Deoxidizers

Sound ingots are produced and blow-holes are eliminated by means of powerful deoxidizers, such as aluminum, silicon and ferro-titanium. All these deoxidizers have the same effect, when used in the necessary varying quantities to produce this result. They all produce solid steel except for the large central cavity. They all diminish segregation. In my experience I have found that an addition of two ounces of aluminum to the ton of steel, is equal to 0.25 per cent of added silicon, and an addition of 0.10 per cent of metallic titanium in the form of ferro-titanium. These additions will all produce the same characteristic central pipe, and if they are used, this piped portion should be discarded in each case. If the rails are milled at each end, which gives a bright surface, as is the practice in England, the pipe is disclosed and the rail is rejected by the inspectors. The cost of the aluminum addition is very small.

It occurred to me that if we were to use a deoxidizer such as aluminum to eliminate blow-holes in the outer envelope of the ingot and then reduce the area of the ingot or the top portion while the center was liquid, that the pipe would not form, and that a solid mass would be found in the body of the squeezed ingot.

Compressing the Ingots

In analyzing and taking sulphur prints off the face of the compressed ingot which was cut longitudinally through its center, I made an interesting discovery. I found that whenever an ingot was compressed while its center was liquid, that no segregation formed in the center of the upper part as is usual, but that it was driven to the internal face of the solid envelope in a fairly regular percentage over the entire length of the liquid area. The solid outer envelope is the normal steel of the heat and is about 3 inches thick. The carbon in this portion in this case was from 0.65 to 0.70 per cent; the carbon in the harder portion next to this varied from 0.75 to 0.80 per cent, and in the center it was about 0.50 per cent. The sulphur and phosphorus also vary in these strata, but as the phosphorus is low in this steel it was not of sufficient amount to be considered.

In ingots compressed while their center is liquid, without the use of a deoxidizer, I find that the center shrinkage cavity is not formed, but

[1]Presented Nov. 7 at an informal meeting of the Iron and Steel Division of the American Institute of Mining Engineers.

that the blow-holes, which are found in the outer envelope, are not obliterated and can be traced into the rail. For this reason I prefer to use a deoxidizer so as not to have any surface blow-holes which tend to give spongy rails.

Making Sound Ingots

The method of procedure is as follows: An ingot, at least 20 x 24 inches in cross-section is used, and 2 ounces of aluminum to the ton of steel are added to the ingot as it is being poured. Aluminum causes a solid outer envelope to be formed, and solidifies the metal earlier than if no deoxidizer were used. The ingot, therefore, can be stripped earlier, and it is then put into the soaking pit to allow the envelope to become thicker, and at the same time to have a proper temperature upon its surface for compression. A 20 x 24-inch ingot is reduced to about 18 x 18 inches, and it is then returned to the soaking pit for proper heating and the solidification of the mass. After this has been accomplished, it is rolled down into a bloom, cropped and passed to the rail mill. The rail produced has the same characteristic formation as the squeezed ingot; a hard working face, a harder ring at back of this and a soft center.

It is the question of this new formation that we manufacturers have to discuss with railroad engineers and metallurgists. If they accept this new structure with the guarantee that in this formation they have no pipe in a rail, then it will be for manufacturers to consider the installation of the necessary preparatory plant to accomplish the liquid compression of the ingot, as it cannot be properly accomplished in any existing rail mill without largely decreasing the output.

Thus far the rails produced by this method have been tested under the drop to the British standard specifications and they pass satisfactorily. The question of making tensile tests from steel in the head has still to be considered, as these will vary as they do today according to the position selected. In fact, small tensile tests are unsatisfactory at best, and it would appear that the only proper method would be to have the testing machine large enough to pull the full-sized head.

The 20th annual report of the Colorado Fuel & Iron Co., Denver, for the fiscal year ended June 30, 1912, has been issued in pamphlet form. As shown in the figures issued some weeks ago, gross earnings increased $1,333,767.15, or 6 per cent over the previous year. Operating expenses increased $1,039,834.69, leaving a net gain of $293,932.46. There were 813,728 tons of iron ore mined; 459,913 tons of limestone quarried; 426,659 tons of pig iron produced; 4,038,852 tons of coal mined; 777,993 tons of coke manufactured and 485,743 tons of finished iron and steel made.

STEADY DECLINE

In Furnace Stocks of Pig Iron Shown Last Month.

In the face of the highest monthly production of pig iron in the history of the country in October, the stocks of iron on furnace banks further declined in that period and in this respect have maintained the steady shrinkage that has been noted for many months past. Statistics which are available covering the principal producing territory in the Pittsburgh, western Pennsylvania, Mahoning and Shenango valleys and Ohio lake districts, show a reduction of 16,000 tons in the month of October, thus placing the figures in makers' hands on Nov. 1 at about 466,000 tons of all grades of iron.

A survey of the statistics collected by competent authorities, shows that the total reduction in the territory covered reached about 80,000 tons during the three months between Aug. 1 and Nov. 1 of the present year. Much of this decline has been with the steel companies, but a considerable part of it has also been effected by the merchant interests. Total stocks in the middle western territory are now fully 40 per cent less than they were on Nov. 1, 1911, when the accumulation of iron was estimated at 750,000 to 800,000 tons.

A comparative statement in tons by fortnightly periods of the estimated stocks in the middle western territory referred to during the past three months is as follows:

Aug. 1	544,000
Aug. 15	533,000
Sept. 1	508,000
Sept. 15	498,300
Oct. 1	482,000
Oct. 15	474,000
Nov. 1	466,000

These figures do not include the stocks on the furnace banks in that territory of the United States Steel Corporation, which, however, have not recently exceeded manufacturing necessities and, in fact, have at times fallen below this minimum figure, as shown by the incursions into the market of the leading producer as a buyer of iron.

TREMENDOUS INCREASE

In Unfilled Tonnage on Steel Corporation Books.

The unprecedented increase of 1,042,874 tons was netted by the bookings in October by the United States Steel Corporation, according to the unfilled tonnage statement as of Oct. 31, which was made public Saturday, Nov. 9. This is the largest monthly increase ever shown since the Steel Corporation began the issuance of monthly tonnage statements as of July, 1910, and it greatly exceeds the hitherto high water mark of December, 1911, which was 942,806 tons. This tremendous increase of booked business has been made in October in the face of the fact that the leading steel maker produced steel in that month at the highest rate in its history. The gain shown reflects the heavy buying that has been done during the past several weeks from the Steel Corporation by large consumers for delivery in the second, third and fourth quarters of next year.

The unfilled tonnage on Oct. 31 stood at 7,594,381 tons compared with 6,551,507 tons on Sept. 30. This places the volume of business on hand at the highest point since June 30, 1907, when the figures were practically the same as at present or 7,603,527 tons. On only four occasions in its history has the total of orders exceeded the present stage and in all these cases a different method of computation was employed, so that some of the inter-company tonnage was included.

Since the plan of making monthly statements of unfilled tonnage has been followed by the Corporation, the statements of business on hand, the tonnage and percentages of increase or decline from the previous month, have been as follows:

Date.	Total.	Change, tonnage.	Change, per cent.
Oct. 31, 1912....	7,594,381	1,042,874+	15.33+
Sept. 30, 1912....	6,551,507	388,132+	6.29+
Aug. 31, 1912....	6,163,375	206,296+	3.46+
July 31, 1912....	5,957,079	149,773+	2.58+
June 30, 1912....	5,807,346	56,363+	0.98+
May 31, 1912....	5,750,983	86,983+	1.52+
Apr. 30, 1912....	5,664,885	360,044+	6.97+
Mar. 31, 1912....	5,304,841	149,359—	2.79—
Feb. 29, 1912....	5,454,200	74,479+	1.38+
Jan. 31, 1912....	5,379,721	294,960+	5.71+
Dec. 31, 1911....	5,084,761	942,806+	23.24+
Nov. 30, 1911....	4,141,955	447,627+	12.06+
Oct. 31, 1911....	3,694,328	83,011+	2.25+
Sept. 30, 1911....	3,611,317	84,668—	2.34—
Aug. 31, 1911....	3,695,985	111,900+	3.33+
July 31, 1911....	3,584,085	223,027+	7.16+
June 30, 1911....	3,361,058	247,871+	7.96+
May 31, 1911....	3,113,187	105,617—	3.28—
Apr. 30, 1911....	3,218,704	228,597—	6.63—
Mar. 31, 1911....	3,447,301	46,758+	1.37+
Feb. 28, 1911....	3,400,543	289,624+	9.31+
Jan. 31, 1911....	3,110,919	436,162+	16.30+
Dec. 31, 1910....	2,674,757	85,656—	3.09—
Nov. 30, 1910....	2,760,413	111,536—	3.88—
Oct. 31, 1910....	2,871,949	286,157—	9.12—
Sept. 30, 1910....	3,159,106	379,088—	10.74—
Aug. 31, 1910....	3,537,128	433,803—	10.92—
July 31, 1910....	3,910,931	286,863—	6.72—
June 30, 1910....	4,257,794	.....	.....

STUBBORN CONTEST

Over Proposed Reduction of Rates on Southern Pig Iron.

The hearings on the complaint of the Sloss-Sheffield Steel & Iron Co., Birmingham, Ala., and other shippers, against the Louisville & Nashville railroad and other carriers, concerning the rate of freight on southern pig iron, has been in progress before Interstate Commerce Commissioner McChord since last Thursday. In 1885 southern furnaces obtained an agreement with the railroads that the freight rates should be adjusted on a sliding scale in accordance with the price of pig iron. Several years ago, the Interstate Commerce Commission condemned the sliding scale plan as unscientific and without warrant in law. The condemnation came when the rate under that agreement to the Ohio river was $3.25 a ton as fixed by the price of pig iron at the furnaces, which was then $18. When the complaint was made, the price had fallen to $10.

James Bowron, of Birmingham, Ala., president of the Southern Iron & Steel Co., testified that the local consumption of pig iron amounts to no more than 15 or 20 per cent. "If," he said, "present rates continue, I see no hope for the merchant furnace producing pig iron for the general market."

George H. Barbour, vice president and general manager of the Michigan Stove Co., Detroit, said that on account of the desirable qualities of the southern pig iron his company would continue to use it so long as the price was not from 50 to 75 cents higher per ton than that of northern pig iron, a substitute for the southern, which he reluctantly admitted a furnace in Detroit, about eight miles from his foundry, has been able to furnish at about the general northern pig iron price. Mr. Barbour, who is also interested in the manufacture of automobiles, testified that the carriers are satisfied with a car revenue of $60 on automobiles from Detroit to New York, which is about the same distance as from Birmingham to Detroit. The revenue on pig iron from Birmingham to Detroit, on the average loading of 27 tons per car, is a little more than double this sum.

J. W. McQueen, vice president of the Sloss-Sheffield Steel & Iron Co., said that 20 years ago his company sold pig iron in Buffalo, Cleveland, Detroit and Chicago in large quantities. Its shipments are now much decreased. The furnaces of the company last year shipped 110,000 tons to interior southern points, about 8 per cent of the production. In 1903, he said, about 38 per cent of their tonnage went to New England and 50 per cent to the middle west. The Birmingham district last year shipped out 1,027,800 tons, which would furnish loads for 38,650 cars.

Frederick Sattler, president of the Belleville Stove & Range Co., Belleville, Ill., and chairman of a committee of 32 stove manufacturers in the central west, appointed to intervene in behalf of the southern furnaces, said that stove manufacturers preferred southern iron and continued using it even after the price, by reason of the high freight rate, exceeded the northern quotations. They did this because they hoped the freight rates would go down and did not wish to drop southern pig iron and then take it up again.

President J. C. Maben, of the Sloss-Sheffield company, was placed upon the stand to testify as to experiments in the introduction of modern furnace equipment. He said that the skip-hoist had not proved economical. He was not convinced that by-product coke ovens would be desirable.

D. O. Ives, traffic manager of the Boston chamber of commerce, said that New England would be greatly stimulated by the reduction of $1 in the pig iron rate. "I believe," he said, "there is enough velvet in the rate to allow its reduction by $1 per ton."

The determination of the carriers to combat the demand of the furnaces for a reduction in rates was made evident when the complainants put on the stand J. P. Muller, a lawyer and accountant, who was formerly employed by the Interstate Commerce Commission. When he had finished his examination in chief and had filed a book of 175 pages, containing 41 exhibits of sets of figures, all tending to show that relatively speaking the southeastern railroads have prospered more during the last 10 years than any others and that they can well afford to reduce the rates, M. P. Calloway, R. Walton Moore and W. A. Northcut, representing the principal southern roads, asked that the cross examination of Mr. Muller be put off and that the Central of Georgia be served with formal notice to come in and become a principal defendant. A searching examination of Mr. Muller's figures is to be made to ascertain whether they are correct. Mr. Muller was excused until some indefinite time in the future.

George B. Hamblin, purchasing agent of the Whitin Machine Works, Whitinsville, Mass., said that taking $1 off the rate of southern iron would save his company $5,000 a year at least. When asked how much of an increase he would make in the wages of his 2,600 employes if he saved $5,000 on the pig iron freight bill, the witness replied, "None". He said that if his company did not take every opportunity to cut down costs, it would not be able to pay the present wages.

ORE DEPOSITS

In Southern Brazil Said to be Extensive—Pending Negotiations.

Some interest attaches to negotiations with regard to the Brazilian iron ore deposit in the state of Minas Geraes, in the south of Brazil. These deposits have been known for some time, but within the last three or four years extensive holdings in them have been acquired by American and English syndicates. The English interests in one of the districts were acquired about four years ago, and are said to be very extensive. This company is building a railroad which is partly completed, which road will also serve a group of properties acquired lately by a strong American syndicate with affiliations in the Lake Superior country. Other interests have acquired deposits in the same vicinity, but not directly tributary to the projected railroad. The deposits are said to be very extensive, more so than any single deposit or even the aggregate of all the deposits of the Lake Superior country. The grade of the ore is hematite of a very high quality. It looks as though the Brazilian field at a very early date will produce considerable iron ore for both the American and European markets. The introduction of American capital into Brazil in this enterprise is likely, and also will lead to more American commitments in the Brazilian field, and generally it looks as though the American mining and railroad industrial investments in Brazil may soon become very large and perhaps larger than in any other of the South American countries.

The Pennsylvania and Maryland Steel companies have issued the second edition of their booklet entitled "Mayari Steel", which describes the manufacture, properties, heat treatment and application of this steel manufactured of Mayari, Cuban, ore. The booklet is illustrated with views of mining operations in the Mayari district and of specimens of Mayari steel under various tensile and torsion tests that have been made.

LATEST MACHINERY NEWS COLLECTED IN LEADING MANUFACTURING CENTERS

In New York, business improvement continues to manifest itself in the machinery trade following the national election, with quite as great emphasis as marked the development during the 10 months leading up to that event. So far, there are no signs that the result of Nov. 5 is going to cause hesitancy in carrying out plans for improvements and extensions to manufacturing plants. Sellers of mechanical equipment regard the present as an early stage of the general industrial prosperity now under way. There is a large aggregate of inquiry for shop equipment before the trade for both standard and special machinery, which will tax stocks and plant capacity to fill when final action is taken. Inquiries, sent to builders of factory equipment in that section, have brought replies that plants now are running close to capacity, and in some instances orders are adequate to justify day and night operations. Further evidence of good business ahead is afforded in the upward revision of price of machinery.

In Pittsburgh, dealers report that business is keeping up at a highly satisfactory rate, although some of the shops are not running full capacity. Without exception, however, builders of machine tools are enjoying a period of prosperity, and there is no indication of a reversal in the trade. The Whitaker-Glessner Co., Wheeling, W. Va., has entered the market for a half dozen tools of various types, and already has closed negotiations for a 60-inch wide shear. The Wheeling Mold & Foundry Co., Wheeling, W. Va., has recently purchased a 30-ton Alliance crane. This interest, it is reported, is contemplating the manufacture of road machinery, and is expected to enter the market shortly for additional equipment. The Pennsylvania railroad has closed for a number of wood-working tools for the Southwestern system, but will not place its entire list, one of the largest to come out in some time, until after the end of the year. Demand for second hand machinery has been good. The wave of prosperity has not yet affected rolling mill machinery builders to the extent it has other lines, and complaint about prices continues to be heard from these interests.

In Chicago, there was a slight pause in the activity of the machinery market, due to the election. Business, however, has now resumed its normal trend and general inquiry for machine tools has been exceptionally good during the past week. There are no large railroad lists in the market at present, but practically all of the western lines are buying tools in small lots almost constantly.

In Cleveland, dealers in machine shop equipment enjoyed a week of satisfactory business. The depression in evidence for a few days preceding the national election was forgotten quickly, and a considerable aggregate of sales, in mostly small lots, was made. The Upson Nut Co., Cleveland, closed on its list of machine tools issued some weeks ago, and which included a vertical boring mill, lathes, radial drill and shaping machines. It was placed largely with Cleveland interests. The volume of business being enjoyed at this time is unusually heavy for this period of the year, and delay in deliveries is becoming a pronounced factor in the general market conditions.

In Cincinnati, the machinery market is dull, following the rush of election week. Business done last week fell short of that of the week previous. Radial drills still seem to be the best in demand, with lathes a very close second. Small electrical equipment, such as generators, motors and dynamos, continues in good demand. A better period is expected with the beginning of next week, when business will be running more smoothly again. Several of the machine tool people have stated that they will not solicit much business before the first of the year, as they are well stocked with orders up to that time.

New Construction

The Krein Chain Co., Wapakoneta, O., has about completed work on an addition, 40 x 50 feet.

The Wilkesbarre Iron Mfg. Co., Wilkesbarre, Pa., will erect a gray iron foundry, 142 x 111 feet.

The Detroit Forging Co., 120 Mt. Elliott avenue, Detroit, Mich., is making an extensive addition to its plant which it expects to occupy by Jan. 1.

The Cleveland-Canton Spring Co., Canton, O., has just completed an addition, 50 x 250 feet, one story, for the manufacture of automobile springs.

Work on a one-story brick and steel addition to the Phoenix Iron Works Co., Meadville, Pa., will be started shortly by the McClintic-Marshall Construction Co., Pittsburgh.

The DeForest Sheet & Tin Plate Co., Niles, O., has increased its real estate holdings, and contemplates enlarging its plant and capacity, according to reports from that city.

The one-story brick foundry of the Enterprise Foundry Co., Pittsburgh, will be remodeled. J. H. Trimble & Bro., that city, were awarded the contract.

The Harrison, N. J., plant of the Hyatt Roller Bearing Co. is to be enlarged. The company is receiving bids for the construction of an addition estimated to cost about $30,000.

The Chandler Co., Springfield, Mass., manufacturer of metal goods, is to have a factory erected for it in Napier street by W. D. Kinsman. The building will be 42 x 77 feet, two stories, estimated to cost $12,000.

It is reported that the Universal Wheel Co., a corporation capitalized at $1,000,000, will receive bids for the erection of a large plant, including foundry and machine shops, at Fort Wayne, Ind. L. Herington is president.

The Lovell-McConnell Mfg. Co., manufacturer of electrical appliances, Newark, N. J., has had plans prepared for a two-story addition to its factory. Frederick A. Phelps, Union building, prepared the drawings.

The Cumberland Motor Co., Nashville, Tenn., of which Joel Cheek is president, will erect and equip one of

the largest garages in the south, with complete facilities for automobile repair and maintenance work of all kinds.

The William A. Hardy & Sons Co., brass founder, Fitchburg, Mass., is to erect a building in Water street. The building will be of brick, with concrete foundation, partly 51 x 100 feet, one story, and partly 54 x 60 feet, two stories.

The city of Chicago expects to build a foundry at 2324 South Ashland avenue. The plant will be equipped to furnish castings for the water department, and details may be obtained from L. E. McGann, commissioner of public works, Chicago.

The Flynn & Emrich Co., founder and machinist, Baltimore, Md., advises that it will make a large addition to its foundry, re-arranging and equipping its plant throughout, and greatly increasing the output. High grade machinery castings, both rough and machined, are manufactured.

J. T. Straus, manufacturer of automobile, carriage and upholstering leathers, has acquired the manufacturing plant of the Edward C. Moore Co., on Chapel street, Newark, N. J. The new owner will make alterations and additions to the property, estimated to cost $55,000.

The E. J. Manville Machine Co., Waterbury, Conn., advises that it is preparing for the erection of a building, 46 x 200 feet. This building is to be given a machine shop equipment and fitted up with a 30-ton electric crane. All machinery has been ordered.

The Osgood Bradley Car Co., Worcester, Mass., is to erect three new buildings at its Greendale, Mass., plant. They will include a finishing shop of concrete and steel construction, to cost $30,000; a machine shop of similar construction, to cost $18,000, and a frame sand blast house to cost $750.

The Tower Grove Foundry Co., St. Louis, advises that it is making an addition to its foundry, 60 x 71 feet. A 10-ton electric crane will be installed, extending about 100 feet and traveling into the old foundry. With the new improvements the capacity of the works will be brought to about 30 tons of gray iron and chilled castings per day.

The De Lion Tin & Rubber Co., Trenton, N. J., recently incorporated to manufacture castings, tubes and rubber specialties for the automobile trade, has completed plans for a plant, two stories high and 245 x 60 feet. Freeman & Hasselman, 39 West Thirty-eighth street, New York, prepared the plans.

The Union Petroleum Co. has made all preparations for erecting a new plant at Marcus Hook, Pa., on the site of the plant which was swept away by fire several months ago. The contract for the new buildings will be awarded in a few days. The plans call for four separate brick structures; a can shop, two stories, 80 x 160; a filling room, 60 x 100; a box shop 40 x 80, and an extra building, 40 x 80. A concrete pier and bulkhead will also be built. The total cost will reach $200,000, exclusive of machinery.

The following bids were received by the department of public works, of New York City, for the construction of an asphalt plant on Avenue A, between Ninetieth and Ninety-first streets: Durkin & Lass, 103 Park avenue, $124,524; Filber Engineering Works Inc., 103 Park avenue, $137,500; North Eastern Construction Co., 225 Fifth avenue, $117,344; Warren Bros. Co., Temple Place, Boston, Mass., $150,168; Marble Arch Co., 216th street, $152,040; and the Ruggles-Robinson Co., 331 Madison avenue, $164,945.

The United States Steel Products Co., 20 Church street, New York, has been awarded a contract to supply 3,500 tons of structural material, by the Panama Canal Commission. The material will be used in the construction of machine shops, forge shops, storage sheds, car shops, foundries, heater houses, and a number of other structures that will be permanently located and operated at Balboa, in connection with the operation of the canal. The erection of these structures will be done by the American Bridge Co.

The Canton Metal Ceiling Co., Canton, O., which was organized several months ago to manufacture a full line of sheet steel building materials, has completed a new plant, one story, 50 x 350 feet, of brick and concrete. This is operating to capacity. The company specializes in metal ceilings, metal shingles and tile. The officers are: President, Harry W. Renkert; vice president, secretary-treasurer and general manager, C. A. Weirich; sales manager, O. A. Zimmerman. Mr. Weirich was formerly general manager of the Kanneberg Roofing & Ceiling Co., Canton.

The Chicago Bearing Metal Co., 332 South Michigan avenue, is about to erect a new plant for the manufacture of brass goods. The plant will cost $200,000 and will be erected on a tract of land which has just been acquired from George F. Harding Jr. The land, which comprises eight and one-half acres, lies between Western avenue and the right-of-way of the Pittsburgh, Cincinnati, Chicago & St. Louis railroad. The property is in the new central manufacturing district of Chicago, which has recently been opened up and where the Brunswick-Balke-Collender Co. and the Continental Bolt & Iron Co. have erected new plants.

The Lewis Electric Welding & Mfg. Co., Toledo, O., advises of its intention to add a gray iron foundry to its plant for the purpose of making high grade castings of all descriptions and also to put in a department for making gray iron piston rings. A building, 120 x 120 feet, will be added to the present building, 50 x 120. The plant will be equipped with the latest type of machines necessary to carry on the work. The company's cupola will have a capacity of from four to five tons per hour.

Water Works

The town of Booneville, Ark., has under consideration the construction of a water works system to be owned by the city.

The contract for the construction of a water works system at Hazard, Perry county, Ky., has been let to C. P. Turner, Louisville, Ky. Equipment and pipe are now being bought.

Gardner S. Williams, engineer, Ann Arbor, Mich., has been retained by the city of Big Rapids, Mich., to draw plans for a new water works system. Bonds in the sum of $50,000 have been recently voted for this project.

Machine Tools

The Marathon Motor Co., Nashville, Tenn., which has been making 30 cars a week, is to install equipment which will double the capacity of its factory.

The New Albany Veneering Co., New Albany, Ind., of which E. V. Knight is president, will be in the market soon for glue-room machinery for an addition to its panel plant. Spreaders, presses, etc., will be installed.

The Moon Motor Car Co., St. Louis, plans to make further improvements to its plant and to install a large amount of new equipment. During the past season additions have been made to the plant which more than double its capacity.

The Kentucky Wagon Mfg. Co., Louisville, Ky., is installing a 24-inch lathe, bolt cutter, multiple spindle drill and sensitive radial drill in its electric vehicle department. The additional equipment will be used in the manufacture of heavy-duty motor trucks.

The Queen City Engineering & Machine Co., Cincinnati, O., recently incorporated at $10,000, advises that it has a machine shop in operation and will handle all kinds of power equipment and will do general repair work.

The company expects to do no building. All equipment, with the exception of a rotary shear, has been secured.

Machine tool dealers in New York are expecting an early announcement of the requirements of the Boston & Maine railroad for the shops now under construction. Representatives having charge of this business are informed that the list of specifications is now in the hands of B. S. Hinckley, Boston, purchasing agent, and copies will be mailed within a short time. The list includes about 200 items, approximating close to $300,000 in value.

Power Plant Equipment

A water and light plant will be installed at Meigs, Ga., by the C. W. Murry Co., Atlanta, Ga.

Corydon, Ky., will have an electric light plant, having approved an $8,000 bond issue for that purpose. Address the clerk of the council.

Beare Bros. Ice Co., Jackson, Tenn., will erect an ice plant at that point, for which $40,000 to $50,000 worth of machinery and equipment will be needed.

The municipal light and water commission, Donaldsville, La., will install Diesel engines and other improved machinery in its plant, $40,000 having been appropriated for that purpose.

Runyon & Co., engineers, 122 Market street, Newark, N. J., have completed plans for an electric light plant, to be operated by the municipality of Camden, N. J.

The mayor of Hardin, Ky., desires prices and estimates for the complete equipment of the city's electric lighting plant, including a 5-kilowatt dynamo, and the necessary wire and street lights.

H. M. Byllesby Co., Chicago, has been engaged to make an investigation of the water power in Grand river, near Grand Rapids, Mich., and to report on the probable cost of acquirement and development.

The Light & Development Co., St. Louis, has acquired the Paris Gas & Electric Co., Paris, Ky., and will operate the light and power plants in the city of Paris. Some extensions of the plant are contemplated.

Electric light and power and water works franchises for the town of Pembroke, Ky., have been purchased by the Pembroke Light, Power & Water Co., which has heretofore been conducting these lines of public service together. Extensive improvements are said to be planned under the separate franchises.

New Buyers

(In order to assist the post office in delivering letters to new concerns, it is suggested that the names of incorporators be written in the lower left hand part of every envelope addressed to such new companies.)

The following manufacturing companies have filed articles of incorporation:

The Bridgeport Screw Co., Bridgeport, Conn.; $350,000; by President William H. Farrell.

The King Machine Co., Bridgeport, Conn.; $50,000; by President John F. King.

Gem City Machine Co., Dayton, O.; $25,000; by Joseph E. McAdams, Harry G. Noble, W. C. Smith, John N. Van Deman, Edward E. Burkhart.

Bartlett All-Steel Scythe Co., Inc., Geneva, N. Y.; $50,000; by Marcus M. Bartlett, George G. Godelle, A. L. Allegreth, all of Geneva.

Fillow Auto Co., Danbury, Conn.; $30,000; to manufacture automobiles; by A. Homer Fillow, Joseph W. Juengst and B. M. Fillow, of Danbury.

Standard Garage, Ltd., Toronto; capital $40,000; to manufacture automobiles and general machinery; provisional directors, Samuel W. Marchment, Harold W Marchment and Douglas L. Berwick.

Chostile Co., Inc., Manhattan, New York City; $10,000; typewriters and writing and printing machines; by Roland Henry Mechtold, Lindlay Vinton, Stallo Vinton, 41 Park Row, New York.

The Cork-Insert Abrasive Wheel Co., Inc., Manhattan, New York City; $50,000; contracting, engineering, construction, manufacturing; by George C. Luebbers, Russell Whitcomb, John C. Bleveney, 209 Parkhurst street, Newark, N. J.

General Industrial

The Lebanon Blast Furnace Co., Lebanon, Pa., has been incorporated with a capital of $200,000. J. M. Shenk, Lebanon, and E. G. Rust, Leesburg, Va., head the new company.

The La Salle Steel Co., Chicago, has been incorporated with a capital of $35,000. The incorporators are William K. Patterson, Alexander B. Shaw and Irwin M. Berner.

The Westinghouse Electric & Mfg. Co., Pittsburgh, has rented the first floor of the Bindley Hardware Co. building, that city, where automobile accessories will be manufactured. About 400 persons will be employed.

The Solvay Steel & Forging Co., Solvay, Syracuse, N. Y., has been reorganized under the name of the Hammond Steel & Forging Co. with a capitalization of $75,000. The plant will be enlarged and the production of forgings increased.

The Calumet Foundry Equipment Co., Harvey, Ill., advises that the article appearing in THE IRON TRADE REVIEW of Oct. 31, in which it was stated that the company had sold its plant to James Pettigrew for $37,500, is incorrect.

The Wright Wrench & Forging Co., Canton, O., is installing a new steam hydraulic forging press for producing large shafts and other heavy forgings. The company expects to manufacture vanadium steel forgings in the near future.

The Atlas Machine Co., Nashville, Tenn., which has been turning out a large number of special orders for steel stairways and fire escapes, as well as several power elevators and other equipment, has just installed a new arbor press to facilitate operations.

O. M. Jones, 30 Church street, New York, a jobber and manufacturers' agent, is desirous of obtaining catalogs, price lists and best jobber's discounts from manufacturers of equipment and materials used in connection with heating and power plants.

Birmingham Brass, Ltd., has been incorporated at Toronto, Can., with $40,000 capitalization. Its incorporators are Frederick Lee, Mahlon Diville Culbert, William Cartwright, George Wellington Spooner and William Blackley, all of Toronto. It will manufacture brass and iron goods.

The Southern Art Metal Co. has been organized at Americus, Ga., with an authorized capital of $100,000. W. C. Hawkins is president, L. W. Rose vice president and general manager, and W. G. Hooks secretary and treasurer. The company will manufacture sheet metal products.

The Keith-Gara Co., Philadelphia, manufacturer of small metal novelties, is about to remove its business to Chester, Pa., according to advices from the latter city. The company has outgrown its present quarters, and being unable to expand its business, is locating in Chester where it expects to double its capacity.

The American Steel Cross Arm Co., Pittsburgh, was recently incorporated, with a capital of $300,000. H. G. McCutcheon and W. H. Anchor are named among the incorporators. The company plans to manufacture iron and steel equipment and will specialize on steel cross arms for telegraph and railroad signal service.

The Janesville Machine Co., Janesville, Wis., has completed the construction of its new two-story plow and blacksmith shop and started op-

erations in all departments on Nov. 4. The new building is of steel and reinforced concrete. The feature of the new building is the hospital which has been built and is being equipped, on the second floor.

The Erie Construction Co., Erie, Pa., has been organized and will be incorporated in a short time. The incorporators are: William E. McCain, Guy Hamilton Strayer and William C. Hoffman. The new concern will conduct a general engineering and contracting business on all kinds of construction work, and will manufacture and furnish building material and supplies connected therewith.

Announcement is made that the Canadian Car & Foundry Co., Montreal, has taken over the Pratt & Letchworth Co., Brantford, Ont., hitherto a branch of the Pratt & Letchworth Co., Buffalo, employing 500 hands in the manufacture of malleable castings. The company thus becomes a purely Canadian concern. The name and the operating management will remain unchanged. Extensive enlargements of the plant will be made.

The Graf Stove & Iron Co., recently incorporated at Louisville, Ky., to handle stoves and ranges, will begin work, as soon as its sheet iron supply arrives, at its plant on Main street. The company's output will be cast by the Graf-Webb Iron Mfg. Co., Louisville, and only the sheet iron work and assembling will be done by the stove company. The Graf-Webb company's plant, which was considerably damaged by fire some time ago, has been remodeled and is doing an increased business.

Control of the American Stamp & Ticket Vending Machine Co., New York, a New Jersey corporation capitalized at $1,500,000, and owning and controlling 20 devices for automatic selling, has been secured by a syndicate headed by Clarence W. Hobbs, of the Hobbs Mfg. Co., and Harry W. Goddard, of the Spencer Wire Co., and including Curt Wollheim, Charles C. Milton, Clarence W. Hobbs Jr., all of Worcester, Mass.; C. N. Carpenter and John T. Hettrick, both of New York; Edward F. Hensen, Philadelphia; Charles T. Bridge, Camden, N. J., and Heinrich Wollheim, Berlin, Germany. Mr. Goddard is president of the company, with Curt Wollheim secretary and treasurer. The company will manufacture in the Hobbs company's plant in Worcester, vending machines for the sale of postage stamps, tickets, collars, ties, buttons, etc.

The Marine Iron Works, Clybourne and Southport avenues, Chicago, advises that it is erecting an addition to its plant, and putting in an overhead and trolley system to take care of the heavy machinery that must be handled from time to time. The company will not require more machinery, as its plant is already completely equipped. Need for additional space was brought about by the necessity for increased room for erecting. The company is at the present time building some 1,000-horsepower engines for the United States government, engines for operating centrifugal pumps of over 1,100 horsepower, as well as several tug engines, ranging from 250 to 1,000-horsepower, for both western and lake shipyards. With the additional space the company expects to handle this heavy machinery much more promptly than it has in the past and make better shipments than it has heretofore.

Large additions are being made to the Cumberland, Md., plant of the N. & G. Taylor Co., Philadelphia, tinplate manufacturer. A new tinhouse is under process of construction, to be 100 x 300 feet. The building will be fire-proof, and will be roofed with the company's own Target and Arrow brand of tin. A 5-ton Shaw traveling crane is to be installed, on a 60-foot span. A 3-ton overhead mono-rail, 128 feet long, with a Shepard electric hoist and conveyor will transfer finished black plate from an adjoining building over railroad tracks and across the yard to the tinning department. The Aetna Foundry & Machine Co. is furnishing the tinning machinery. The pickling machine is being built by the Mesta Machine Co., Pittsburgh. A new power house has been added to the two complete electrical units previously used. A two-story storehouse for general mill supplies and another building to house the mill office and the laboratory have been erected.

Financial

The Star Drilling Machine Co., Akron, O., has increased its capital from $500,000 to $1,000,000.

The stock of the Menominee Machinery Co., Menominee, Wis., which has gone out of business, has been purchased by Peter Arnovitz, proprietor of the Marinette Iron & Metal Yards, Marinette, Wis.

The Suffolk Gas & Electric Light Co., Long Island city, N. J., has filed an application with the state public service commission, for authority to issue $150,000 worth of bonds for improvements and extensions to its plants and distributing system in Bay Shore, L. I.

A preliminary certificate of dissolution has been filed with the secretary of state of Connecticut by the Vulcan Iron Works, New Britain, Ct., by Harris Whittemore, C. L. Berger and William J. Griffin, directors. Claims are being received by Arthur H. Oldershaw, New Britain.

The Naugatuck Malleable Iron Co., Naugatuck, Ct., through Harris Whittemore, C. H. Berger and S. Mannweiler, directors, has filed a preliminary certificate of dissolution with the secretary of state by agreement of stockholders. Claims are being received by Mr. Mannweiler, in care of the company.

The Muskegon Steel Castings Co., Muskegon, Mich., which was recently sold to William E. Jeannot, of Muskegon, following its bankruptcy, has been reorganized by Mr. Jeannot as the Western Michigan Steel Foundry Co. The new company is capitalized at $15,000, of which amount $10,000 are paid in the form of the property of the company. There are 150 shares of $100 each.

The Acme Steel Goods Co., Chicago, manufacturer of steel and wire goods, advises that while its capital stock has been increased from $400,000 to $500,000, all this stock has been taken by present stockholders at $125. An addition, 35 x 150 feet, is being made to the machine shop. A large warehouse will be built. It is further stated that the business this year is 26 per cent ahead of the best year the concern has had in the 32 years it has existed, and the increase was needed to handle this business comfortably.

Trade Notes

The Lavigne Gear Co. has moved from Corliss, Wis., to Racine, Wis.

The Bucyrus Co., South Milwaukee, Wis., is publishing a new house organ called "The Excavating Engineer."

Fires

Fire of unknown origin seriously damaged the foundry of H. R. Ousler, Suffolk, Va., recently.

The paint shop of the Holmes Machine Mfg. Co., Sparta, Mich., has been damaged by fire to the extent of several hundred dollars. The plant is owned by the Sears-Roebuck Co., Chicago, and manufactures gasoline engines.

The plant of the George A. Jelly Foundry Co., allied with the William Swindell & Bros. Co., Pittsburgh, was nearly destroyed by fire last week. Suspension of operations will cause the heaviest loss, as the plant was fully covered by insurance.